Archaeological Research in the Lesser Slave Lake Region

A Contribution to the Pre-Contact History of the Boreal Forest of Alberta

By Raymond J. Le Blanc

104-07498/

Archaeological Research in the Lesser Slave Lake Region

Archaeological Research in the Lesser Slave Lake Region

A Contribution to the Pre-Contact History of the Boreal Forest of Alberta

By Raymond J. Le Blanc

Mercury Series
Archaeology Paper 166
Canadian Museum of Civilization

© Canadian Museum of Civilization 2004

All rights reserved. No part of this work covered by the copyrights hereon may be reproduced or used in any form or by any means — graphic, electronic or mechanical, including photocopying, recording, taping or information storage and retrieval systems — without the prior written permission of the publisher.

NATIONAL LIBRARY OF CANADA CATALOGUING IN PUBLICATION

Le Blanc, Raymond Joseph

Archaeological research in the Lesser Slave Lake Region
a contribution to the pre-contact history of the boreal forest of Alberta

(Mercury series)
(Archaeology paper, ISSN 1707-8989 ; no. 166)
Includes an abstract in French.
ISBN 0-660-19331-0
No de cat. NM23-1/166E

1. Prehistoric Peoples — Alberta — Lesser Slave Lake Region.
2. Excavations (Archaeology) — Alberta — Lesser Slave Lake Region.
3. Lesser Slave Lake Region (Alta.) — Antiquities.
4. Native Peoples — Canada — Antiquities.

I. Canadian Museum of Civilization.
II. Title.
III. Series.
IV. Series: Archaeology paper (Canadian Museum of Civilization) ; no. 166.

E78.A34L42 2004 971.23'1
C2004-980198-8

PRINTED IN CANADA

Published by the
Canadian Museum of Civilization
100 Laurier Street
P.O. Box 3100, Station B
Gatineau, Quebec
J8X 4H2

Author: Raymond J. Le Blanc
Manager, Publishing: Deborah Brownrigg
Coordinator, Internal Publishing Programme and Co-Publications: Sylvie Pelletier
Design: Hangar 13 Art & Design

Front cover photo: University of Alberta Field School students starting excavation of the Upper Bench at the Slump Site, 1988. Photo by R. Le Blanc.
Back cover photos: Lesser Slave Lake from Slump Site (left); Lower Bench Excavations, Slump Site (right), 1988. Photos by R. Le Blanc.

OBJECT OF THE MERCURY SERIES

The Mercury Series is designed to permit the rapid dissemination of information pertaining to the disciplines in which the Canadian Museum of Civilization is active. Considered an important reference by the scientific community, the Mercury Series comprises 400 specialized publications on Canada's history and prehistory.

Because of its specialized audience, the series consists largely of monographs published in the language of the author.

In the interest of making information available quickly, normal production procedures have been abbreviated. As a result, grammatical and typographical errors may occur. Your indulgence is requested.

How to Obtain Mercury Series Titles
Telephone: 1-819-776-8387 or, toll-free in North America only, 1-800-555-5621
E-mail: publications@civilization.ca
Web: cyberboutique.civilization.ca
Mail: Mail Order Services
Canadian Museum of Civilization
100 Laurier Street
P.O. Box 3100 Station B
Gatineau, Quebec J8X 4H2
CANADA

BUT DE LA COLLECTION MERCURE

La collection Mercure vise à diffuser rapidement le résultat de travaux dans les disciplines qui relèvent des sphères d'activités du Musée canadien des civilisations. Considérée comme un apport important dans la communauté scientifique, la collection Mercure présente 400 publications spécialisées portant sur l'héritage canadien préhistorique et historique.

Comme la collection s'adresse à un public spécialisé, celle-ci est constituée essentiellement de monographies publiées dans la langue des auteurs.

Pour assurer la prompte distribution des exemplaires imprimés, les étapes de l'édition ont été abrégées. En conséquence, certaines coquilles ou fautes de grammaire peuvent subsister : c'est pourquoi nous réclamons votre indulgence.

Comment se procurer les titres parus dans la collection Mercure
Téléphone : 1 819 776-8387 ou sans frais, en Amérique du Nord seulement, 1 800 555-5621
Courriel : publications@civilisations.ca
Web : cyberboutique.civilisations.ca
Poste : Service des commandes postales
Musée canadien des civilisations
100, rue Laurier
C.P. 3100, succursale B
Gatineau (Québec) J8X 4H2
CANADA

Abstract

This book presents the results of reconnaissance and excavations undertaken over several field seasons in the Lesser Slave Lake region of Alberta's boreal forest. During the 1980s and 1990s, archaeological research in the region uncovered 81 sites. A majority of these were found in the western portion of the study area, suggesting that resources such as fish and game may have been more plentiful in the west than in the east. Extensive excavations of two sites in particular indicate occupation of the study area from early Holocene times, although the majority of material relates to the late Holocene. In addition, the discovery of exotic materials in the region — such as obsidian from British Columbia, some 1,000 kilometres to the west, and Tertiary Hills Tufaceous Clinker, from Fort Norman in the Northwest Territories, some 1,400 kilometres to the north — indicate some form of trade over vast areas of western Canada. Other significant findings include evidence of sustained influence from the Taltheilei Tradition: an Athapaskan group whose homeland lies in the central Northwest Territories. Also evident is contact with Late Prehistoric Plains cultures from the south. The lack of ceramics found at any of the sites during this project, or from any of the smaller, more focussed heritage management studies undertaken in the region, was also of interest, suggesting that Cree peoples might have abandoned pottery-making by the time they moved into north-central Alberta at the dawn of Euro-Canadian contact.

Résumé

Cet ouvrage présente les résultats d'études de reconnaissance et de fouilles réalisées pendant plusieurs campagnes sur le terrain aux abords du Petit lac des Esclaves, dans la forêt boréale de l'Alberta. Les recherches archéologiques effectuées dans cette région au cours des années 1980 et 1990 ont permis de mettre au jour 81 sites, situés pour la plupart dans la partie ouest de la zone d'étude. Cela donne à penser que des ressources comme le poisson et le gibier pourraient avoir été plus abondantes à l'ouest qu'à l'est. Les fouilles poussées dont ont fait l'objet deux sites particuliers révèlent que la zone étudiée était peuplée dès le début de l'Holocène, même si la majorité du matériel date de la fin de cette période. En outre, la découverte dans la région de matériaux exotiques, comme de l'obsidienne provenant de la Colombie-Britannique, à quelque 1 000 kilomètres à l'ouest, et du tuf cinéritique des collines du Tertiaire provenant de Fort Norman, dans les Territoires du Nord-Ouest, à environ 1 400 kilomètres au nord, porte à croire que des échanges avaient cours sur de vastes étendues de l'Ouest canadien. D'autres découvertes importantes méritent d'être soulignées, notamment les traces d'une influence soutenue des Talthéiléiens, groupe athapascan originaire du centre des Territoires du Nord-Ouest. On a également trouvé des signes de contacts avec des cultures du Sud datant de la période préhistorique tardive des Plaines. Il est intéressant de signaler l'absence de céramiques dans tous les sites étudiés au cours de ce projet et dans le cadre de projets plus circonscrits et ciblés de gestion du patrimoine entrepris dans la région, ce qui donne à penser que les peuples cris pourraient avoir abandonné la poterie lorsqu'ils se sont établis dans le centre-nord de l'Alberta, à l'époque des premiers contacts euro-canadiens.

Contents

Abstract v

Résumé vi

List of Figures ix

List of Tables xi

Acknowledgements xiii

CHAPTER 1. BACKGROUND 1
  Project Narrative 1
  Lesser Slave Lake 3

CHAPTER 2. STUDY AREA RECONNAISSANCE 9
  Previous Archaeological Work 9
  North Shore 10
  Buffalo Bay and South Heart River 14
  South Shore 22
  East Shore 28
  Miscellaneous 30
  Summary 31

CHAPTER 3. THE SLUMP SITE 37
  History of Work 38
  Stratigraphy 40
  Features 42
  Miscellaneous 44
  Refitting Study 47
  Artifact Analysis 51
  Faunal Remains 91
  Chronology 96
  Summary 97

CHAPTER 4. THE HIDDEN CREEK SITE 101
Stratigraphy 104
Features 105
Refitting Study 105
Artifacts 109
Faunal Remains 128
Chronology 129
Summary 130

CHAPTER 5. SYNTHESIS AND CONCLUSIONS 133
Research Challenges in the Boreal Forest 133
Terminology 136
Lesser Slave Lake and the Northwest Interior Culture 136
Trade/Exchange 145
Conclusion 146

Appendix A: Site Summaries 147

Appendix B: Historic Period Features at Big Point 157

Endnotes 165

List of Works Consulted 167

Figures

1 Map of Study Area 2
2 Extension of Lesser Slave Lake 5
3 Shaw Point and South Shore Sites near Joussard 12
4 North Shore Sites in the Cut Bank Area 13
5 North Shore — Shaw Creek to Big Point Sites 14
6 Sites in the Narrows Area of Lesser Slave Lake 16
7 Buffalo Bay Area Sites 17
8 Location of Tertiary Hills Tufaceous Clinker Flakes at GjQa-3 18
9 View to North of Sites on Terraces in the Grouard Mission Area 19
10 View of Terraces along South Heart River 19
11 Sites in the Big Prairie Area, West of Buffalo Bay 20
12 GjQc-5 and GjQc-6 Adjacent to Wetland 21
13 Sites in the Swan River Delta Area 23
14 Projectile Points from GjQc-5 24
15 Jadeite Adze (obverse/reverse) and Steatite Pipe 25
16 Sample of Celts (obverse/reverse) from Madsen Site 27
17 Projectile Points from the Madsen Site (GhPv-1) 29
18 Sites in the Canyon Creek Area 30
19 Northeast Shore Sites 31
20 East Shore Sites 32
21 Lanceolate Points from the Zuehlke Site (GjQa-8) 33
22 Lanceolate Bifaces from the Burley Site 35
23 View of Slump Site from the Beach 37
24 Map of Slump Site 39
25 Typical Profile at the Slump Site 40
26 Composite East-West Profile across North end of Excavation 41
27 Fire-cracked Rock Cluster 43
28 Modified Fire-broken Rock Concentration 43
29 Modified Fire Broken Rock Distribution for Level 3 45
30 Modified Fire-cracked Rock Concentration in a Pit 46
31 Map of Refitted Artifacts 48
32 Display of Distances between Refitted Artifacts 49
33 Distribution of Refit Types and Distances 50
34 Organic Tool Fragments 54
35 Cobble Cores 58
36 Slump Site Core Size Distributions 59
37 Bipolar Cores 62
38 Cobble Cores: Refitted and Bipolar 63
39 Debitage Size Distributions 64
40 Bifacial Flake Sizes by Major Raw Materials 65
41 Reduction Stages by Major Raw Material for Bifacial Flakes 68

42 Core Flake Sizes by Material 69
43 Reduction Stage by Raw Material for Core Flakes 70
44 Cobble Spall Sizes 71
45 Modified and Unmodified Flake Comparisons 73
46 Sizes of Modified Cobble Spalls 75
47 Modified Cobble Spalls and Preform 77
48 Projectile Points and Biface Implements 81
49 Choppers 83
50 Choppers 84
51 Hammerstones 86
52 Pièces Esquillées 88
53 Scrapers 89
54 Distribution of Faunal Remains for Level 2 95
55 Distribution of Faunal Remains for Level 3 96
56 Map of Hidden Creek Site 101
57 Aerial View of Hidden Creek Site, 1980 102
58 Top: Composite Profile of N3W1 (right) and N3W2; Bottom: Composite Profile of N3W3 (right) and N3W4 103
59 Composite Stratigraphic Profile. Bottom two cover the same profiles as the walls in Figure 58 104
60 Plan and Profile Views of Feature 1 Hearth 106
61 Top, Fire-cracked Rock near Hearth. Bottom, plan view of hearth in N1-2E29 and N1-2E30 107
62 Rock Concentration 108
63 Map of Refits for Hidden Creek 109
64 Distribution of Refit Distances for Hidden Creek 110
65 Flesher or Wedge and Barbed Point Fragments 111
66 Fragments of Bone and Antler Implements 114
67 Modified Spall, Scrapers, Pièces Esquillées, Edge Modified Flakes 124
68 Hidden Creek Bifaces 125
69 Contact Period Artifacts 129

Tables

1 Basic Attributes for GjQc-5 Projectile Points 21
2 Level and Inter-level Refits 49
3 Summary of Artifact Categories for the Slump Site 52
4 Distribution of Raw Materials 55
5 Distribution of Raw Material by Debitage Type 57
6 Summary Statistics for Cores 60
7 Summary Weight Statistics for Flakes and Shatter 66
8 Summary of Weight Statistics for Unmodified Cobble Spalls 72
9 Summary Weight Statistics for Modified Fire-broken Rock 73
10 Sizes and Raw Materials for Modified Flakes and Shatter 74
11 Summary of Weight Statistics for Modified Cobble Spalls 75
12 Summary Statistics for Projectile Points 80
13 Size and Material for Pièces Esquillées 87
14 Summary of Scraper Attributes 90
15 NISP for 1988 Slump Site Faual Assemblage 93
16 NISP and MNI for 1989-90 Slump Site Faunal Assemblage 94
17 Alteration on Faunal Material (1988-1990 Assemblage) 95
18 Radiocarbon Samples from the Slump Site 97
19 Refit Distances (Units in Metres) 109
20 Artifact Categories for the Hidden Creek Site 112
21 Summary Statistics for Hidden Creek Flakes and Shatter 117
22 Raw Material Types for Hidden Creek Debitage 118
23 Summary of Basic Attributes for Quartzite Cores 118
24 Basic Attributes for Chert Cores 119
25 Summary Attributes for Bipolar Split Pebbles 119
26 Modified Cobble Spalls 120
27 Basic Attributes for Edge Modified Flakes 121
28 Summary Attributes for Pièces Esquillées 122
29 Summary of Basic Metric Attributes for Scrapers 123
30 Summary Attributes for Anvils 127
31 Basic Attributes for Hammerstones 127
32 Summary Counts for Hidden Creek Faunal Assemblage 129
33 Radiocarbon samples from GjPx-6 130

Acknowledgements

Over the years many people have contributed to this project. I wish first of all to express my appreciation to the former Archaeological Survey of Alberta that supported the first three seasons of work on Lesser Slave Lake, and extend sincere thanks to my friends and colleagues in that organization, including Bill Byrne, Jack Brink, Paul Donahue, Jack Ives, Rod Vickers, Bruce Ball, Mike Forsman, Heinz Pyszczyk, Brian Ronaghan, Bob Dawe, Dave Burley, Craig Shupe and John Lodge for providing a stimulating and supportive work environment.

Thanks also to field crews during the first three years, and particularly Bob Dawe for his field and lab skills, and also to the members of the University of Alberta archaeological field school (1988-1990) and the students and lab supervisors (Richard Lello, Ingrid Kritsch, Murielle Nagy, and Beth Mann) for their important contributions. Alberta Parks personnel in Hilliard's Bay Provincial Park provided camping space and many shared social occasions during the early years. Thanks particularly to Bob Ward, Marylou Rich, and Bernie Johnston, and in the late 1980s to George Yanicki. While the field school was operating, we were allowed to use the facilities of Alberta Vocational Centre in Grouard, including staying in residence, use of classrooms as labs, and much other logistical support. Thanks very much to Dan Vandermeulen, President, and all of his staff, including Duane Nichols and Rick Roberts for the helping us with surveying; the late Liz Heighs, for assistance with administration; and the late Mabel Goulet, for her cooking and friendship.

Thanks is also due to Tim Schowalter and Murielle Nagy who did the faunal analyses, as well as Shirley Harpham, University of Alberta who provided advice and supervised faunal work done as part of student projects. My appreciation also to Jeff Bailey for analysis of obsidian samples.

I would also like to thank local farmers: to Frank Madsen, Faust, who loaned part of his collection for study and provided information, stories, and a fascinating tour of his farm; to Maryon Cox, Prairie Echo, for his hospitality and interest in our project; to Jack Burley, High Prairie, for loaning parts of his collection that included some of the earliest artifacts from the region; and to the Zuehlke family, Salt Prairie, for showing us the lanceolate points found on their property.

Thanks also to Richard Morlan, Ian Dyck, and David Morrison for their comments on an earlier draft. Any omissions or commisions are entirely my responsibility.

I would like to acknowledge support for this project from: the Government of Alberta, The Alberta Historical Resources Foundation, Support for the Advancement of Scholarship Research Fund, and the Department of Anthropology and Special Sessions, University of Alberta.

Finally, my sincere apologies to anyone I have overlooked.

CHAPTER 1

Backround

Project Narrative

This study is based upon seven field seasons of archaeological survey and excavation work in the Lesser Slave Lake region of northern Alberta. The work began in 1979 when I joined the staff of the then Archaeological Survey of Alberta[1] as a boreal forest archaeologist, with responsibilities for the northwestern section of the province. My introduction to field work in the region was a short two week visit to two new provincial parks, Hilliard's Bay, on the northwest shore of Lesser Slave Lake and Notikewin Provincial Park on the Peace River northeast of the town of Manning (Le Blanc 1980). The work involved an assessment of specific areas that were going to be affected by park expansion. The work in Hilliard's Bay was particularly instructive, as four sites were quickly found in shoreline settings in a fairly restricted area of what was then the campground day-use area. I found the lake impressive and the immediate discovery of several sites for seemingly little effort to be very attractive indeed for further research.

Over the winter of 1979-80, I completed the analysis of the small collections that we found in Hilliard's Bay Provincial Park, and proposed a research project to conduct survey and excavation the following summer in areas around Lesser Slave. Not unexpectedly, I discovered that there had been virtually no in-depth research in the area since the late 1960s-early 1970s. What had been done consisted of brief surveys, touching only the more accessible areas of the lake. In this, the Lesser Slave Lake region was no different from most of northern Alberta; there were some promising results from scattered locations, but large regions of the northern part of the province were virtually unknown.

Given the size of Lesser Slave Lake, it seemed apparent that it must have played an important role in prehistoric land-use patterns in the region (Figure 1). This possibility was made more obvious by the fact that a cursory examination of biophysical evaluations of the lake's regional resources indicated that there were abundant fish and waterfowl in the lake proper, and that these were complemented by large and small game in the boreal forest area on the north, east, and south sides of the lake. Moreover, the aspen parkland area west of the lake, was good bison habitat, and may have been maintained as such by aboriginal burning. In terms of basic archaeological research, the lake seemed to present an ideal opportunity for a long-term research programme.

The objective of the 1980 work was to begin a survey of present and former shorelines of Lesser Slave and adjacent Buffalo Bay. The latter is a separate water body that lies to the northwest of the lake but was formerly part of a much larger lake (Figure 2). The intention of this research was to obtain baseline data for a first approximation of a culture-historical framework. Fifty-two new sites were found during this first season, most occurring in the northwest corner of Lesser Slave and on terrace systems overlooking Buffalo Bay. In addition, limited test excavations were conducted at two sites (GiQa-3 and GjPx-6) that were located on the first terrace, 4.5 m above the 1980-81 lake level.

During the following season I returned to the lake (1) to follow up with more intensive test excavation at one of the sites found in 1980 (GjPx-6), (2) to do additional testing to determine the limits of the other site (GiQa-3) as well as to monitor the effects on the site of wave-related erosion, and (3) to continue the inventory. Twenty-four square metres were opened in a block excavation at GjPx-6, and an additional 29 sites were discovered on and around the lake. A short two week project in 1982 involved topographic mapping of GiQa-3 and GjPx- 6, as well as excavation of 10 square metres at GjPx-6.

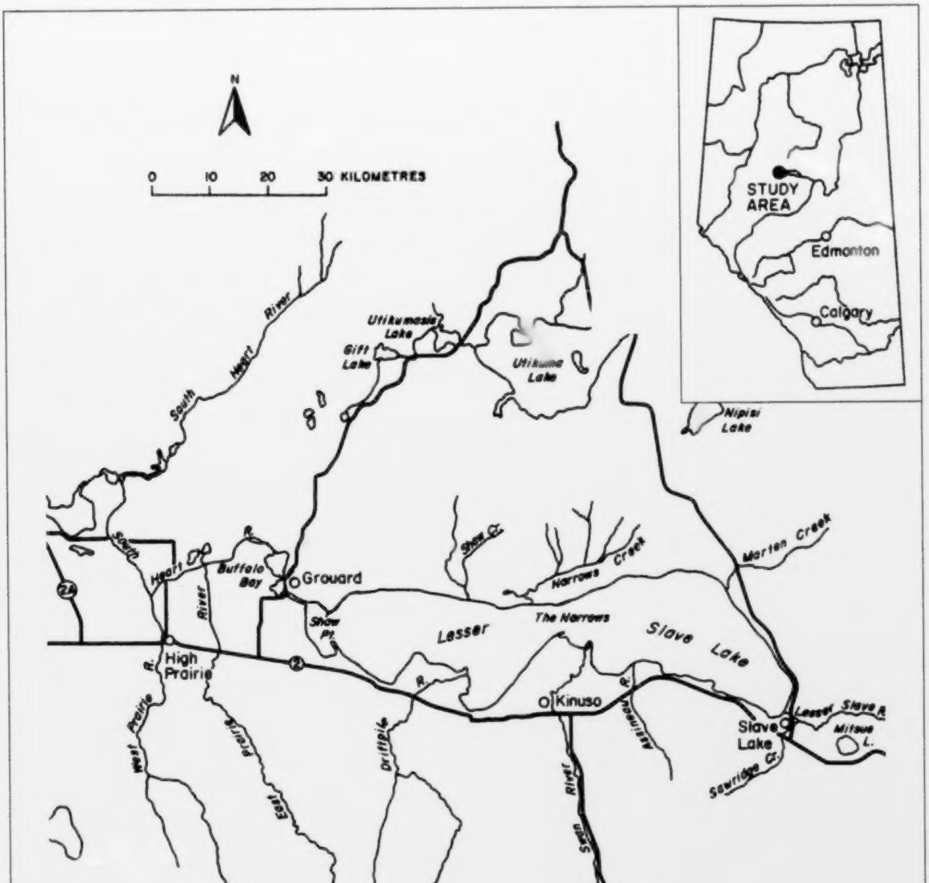

N
0 10 20 30 KILOMETRES
STUDY AREA
Edmonton
Calgary
Utikumasis Lake
Gift Lake
Utikuma Lake
Nipisi Lake
South Heart River
R.
Buffalo Bay
Grouard
2A
South Heart
River
Shaw Cr.
Narrows Creek
Marten Creek
Shaw Pt.
The Narrows
Lesser Slave Lake
High Prairie
R.
2
R.
Kinuso
R.
Lesser Slave R.
Slave Lake
Mitsue L.
Sawridge Cr.
West Prairie
East Prairie
Driftpile
Swan River
Assineau

Figure 1: Map of Study Area

After a hiatus of six years, I returned to GiQa-3 in 1988. The continuation of work at this site was done within the context of an archaeological field school offered by the University of Alberta. Six weeks of excavation were conducted in each of the years between 1988 and 1990 inclusive, with a total area opened of some 87 m^2.

The purpose of this report is twofold. My major objective is to put on record the results of primary research in a very poorly known region of Alberta's boreal forest. Although there has been a significant amount of research throughout northern Alberta over the past 25 years, the majority has been in the realm of cultural resource management and a great deal of this has focussed on tarsands development in the Fort McMurray area. Of necessity, most CRM work concentrates on specific locations that are threatened with linear (e.g, seismic, pipeline or road rights-of-way) and/or areal impacts (e.g., mine sites and associated infrastructure, forestry cut-blocks). The Lesser Slave Lake research was carried out in a region that has been largely peripheral to areas where CRM work has concentrated. As such it complements the latter, but differs somewhat in its use of a regional approach. The subsidiary objective is to explore the use of lithic technological analysis (see Chapter 3) of a quartzite dominated assemblage in the southern boreal forest. Because of a number of factors (see Chapter 5), boreal forest collections can be characterized by few types of tools and small numbers of any specific type (e.g., projectile points). Working with such data is challenging and requires supplementing traditional typological studies with a variety of other approaches.

The next section presents a general synthesis of some of the characteristics of the lake in terms of historical context and biophysical variables. Chapter 2 summarizes results of the inventory portion of the 1980-81 field work. Chapter 3 presents the results of the analysis of the Slump site (GiQa-3) collections. The bulk of this analysis deals with the 1988-90 collections. Chapter 4 presents the results of the analysis of the Hidden Creek site (GjPx-6) but differs somewhat from the approach taken with the Slump site, since the descriptions were completed in the mid-1980s, and I did not have sufficient time or resources to update the analysis to some of the approaches used there. Nonetheless, there is sufficient information to characterize the assemblage, and make it useful for comparison with information from other sites in the region. In the last chapter, I address issues of land-use patterns and local as well as regional culture-history. As few radiocarbon dates were run (many of the sites with so-called diagnostic artifacts were surface finds), this discussion relies heavily on more traditional comparative methods, drawing on information from adjacent regions.

Lesser Slave Lake

At almost 1,200 square kilometres (Nemanishen and Cheng 1978:1), Lesser Slave is the largest lake in Alberta. The immediate region of the lake falls within what is known as the Lesser Slave Lake Lowland. This area is bordered by uplands to the north (Utikuma Upland), east (Pelican Mountains) and south (Swan Hills). On the west it grades to the

Peace Lowlands and Wapiti Plain near the town of Fahler (University of Alberta 1969:9). The south shore of Lesser Slave Lake has two large deltas "formed where Driftpile River and Swan River discharge into the lake" (Nemanishen and Cheng 1978:1). The Swan River delta just east of the middle of the lake is by far the largest. It has expanded well out into the lake, and is now separated from the north shore by about 4 km of shallow, open water known as the "Narrows." The deltas are backed by the Swan Hills that rise to an elevation of some 4000' asl.

Along the east shore, the lake drains into the Athabasca River through Slave River, which exits the lake just north of the town of Slave Lake. Extending east from the mouth of Slave River and bordering the river is an expanse of low, poorly drained muskeg. North of the river, the east shore of the lake consists of a narrow coastal strip that is backed by Martin Mountain. The south end of this strip has a band of active, but partially vegetated sand dunes that are about 20 m high. These separate the sandy beach from the muskeg lying to the east. They continue north for a few kilometres, then merge into a stable lake terrace that continues north to beyond Martin River, the only other notable watercourse on the east side of the lake.

The north side of the lake consists of a fairly straight shoreline, usually with a 4 m terrace next to the lake, which then rises quite sharply in a series of rather narrow terrace benches to the 2000' contour interval. The rather monotonous north shore of the lake is broken by a rounded peninsula-like feature on the north side of the Narrows, which has apparently developed as a result of wave action; two rather subdued points at 10 km (Big Point) and 35 km west (Cut Bank Point) of the Narrows; and finally, a very well-defined peninsula called Shaw Point in the northwest corner of the lake. The west end of the lake borders a broad, flat and poorly drained plain that lies adjacent to the lake. Running along the north side of this area is a channel that connects the northwest end of the lake with Buffalo Bay, now a large, but shallow and weed-infested water body that represents an extension of the main lake. Originally, the lake may have extended well beyond Buffalo Bay to the confluence of the South Heart and West Prairie rivers, some 20 km further west. Indications of the much greater potential size of the lake are suggested by Nemanishen and Cheng (1978:1) who note that:

> ***Sediment from these two rivers and the East Prairie River has in-filled the western portion of Lesser Slave Lake. This in-filling created a 60 square mile lowlands region whose maximum relief is less than eight feet above the normal lake level of 1892 feet. During extreme flood levels in 1935, the entire western lowlands and the various river deltas were inundated to about the 1,900 foot contour...***

These authors illustrate the effect of this flooding (Nemanishen and Cheng 1978, Figure 2) and it appears that the western portion alone would have increased the overall size of the present lake by about 30% (Figure 2).

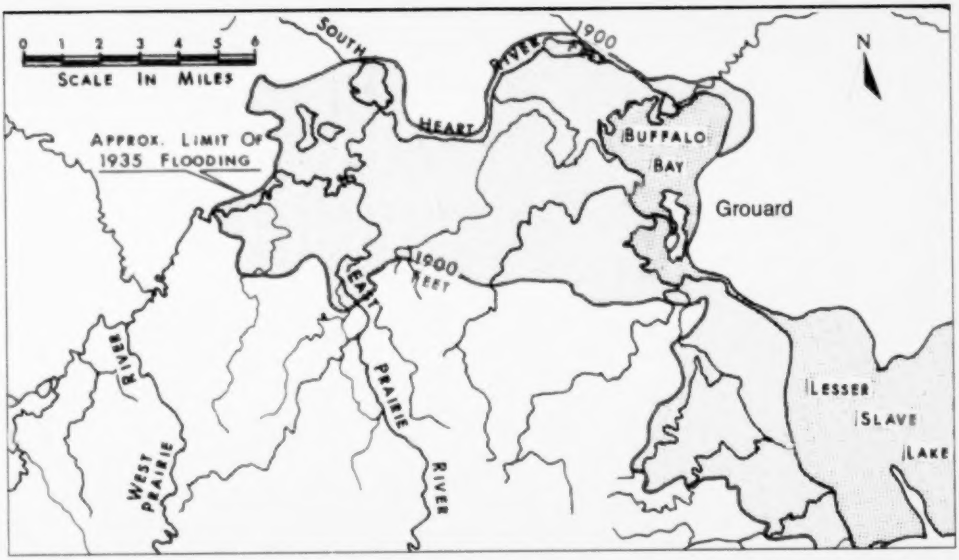


Figure 2: Extension of Lesser Slave Lake as Indicated by Extreme Flooding in 1935; after Nemanishen and Cheng 1978, Figure 2

Quaternary Geology

Elevated terraces suggestive of higher stages in the lake's geomorphic history are obvious in the cleared areas in Grouard Mission, and extending around Buffalo Bay to the north and farther west. Similar ancient terraces were encountered in the dense bush fringing the lake, particularly along the north shore. Consequently, a brief review of the geological context is useful.

The study region lies in the Alberta Plateau of the Interior Plains of Canada physiographic region (Klassen 1989). St. Onge (1972), Mathews (1980), and Klassen (1989) have presented scenarios for glacial recession in northwestern Alberta that are related to several stages of pro-Glacial Lake Peace. Until the beginning of the Phase 4 Clayhurst stage, the Lesser Slave Lake region was covered with ice. Beginning in the early Clayhurst stage (4A), the outlet(s) of Glacial Lake Peace was "along the line of the Fish Creek moraine" (Mathews 1980:17), southwest of High Prairie. This pattern continued through the late (4B) stage of Clayhurst. In the subsequent Indian Creek stage, the outlet extended through the Iroquois Lakes Spillway, just west of High Prairie, which "leads to Lesser Slave Lake and Athabasca River drainage" (Mathews 1980:18). According to St. Onge (1972), the Lesser Slave valley was present "...about 11,000 years ago," which would be equivalent to the "end of the Clayhurst stage or a later stage of Lake Peace (Mathews 1980:19).

Resources

Historical Comments

Historical records show that the resource rich nature of Lesser Slave Lake was recognized when it was first seen by Europeans at the end of the 18th century, and continued to attract attention throughout the 19th. David Thompson was the first white man to visit the lake on 29 April 1799. He described it from a vantage point on the east end apparently not far from the opening of the Slave River.

> ***The Slave Lake has a very bold appearance. Its banks are high hills covered with seeming small pines and about two thirds up them are ridges of snow: Their height may be estimated at 800 ft perpendicular above the level of the lake and behind these appear hills of greater magnitude and height. The shore of the Lake is a tolerable fine sand and gently deepening. The head of the river is barred with this sand and has not above 10 or 12 inches of water. (Babcock n.d.:46, citing David Thompson's Journals 1799-1804, Vol. 6, No. 12)***

A nearly contemporaneous comment by Peter Fidler adds that:

> ***The SW side is more level and the Country in general is more dry and freer from Rocks — about the lake in several places, particularly on the N and NW borders of it Buffalo is said to be pretty plentiful — and quite thro the Lake plenty of large Trout & Tickameg[1] is to be caught — (Babcock n.d.:46, from Peter Fidler's Journal 1799-1800)***

The fish resource mentioned by Fidler was important throughout the operation of the North West Company post on Buffalo Bay, and continued to be so after amalgamation with the Hudson's Bay Company in 1821. In this respect, Shaw Point in the northwest corner of the lake played a major role as a fishing station for the forts, as fishing on Buffalo Bay was marginal (Baergren 1967:37-38). Nearly 25,000 whitefish were taken from Shaw Point in the fall of 1820 (Babcock, notes, B115/e/2).

Fur returns for the Lesser Slave Lake region also point to its comparative richness. Morton (1973:698) noted that the area "was by all odds the most productive of the Districts east of the Rockies." He also noted that it was a major provisioning post, as it "produced the great mass of pemmican which provisioned brigades of the North and the boats running from Lake Winnipeg to York Factory" (ibid.).

Even in the late 19th century, observers continued to remark on the presence of abundant wildlife. Macoun (1947:137), for example, noted that trappers were able to obtain nearly 8,000 beaver in the winter of 1878. Maurice (1947:21), writing of a visit to the lake in 1898, observed: "I finally arrived at Lesser Slave Lake which was then a land of plenty with jumbo whitefish selling from ten to twenty-five cents." On a visit in 1872, another visitor noted that:

> ***The waters of this lake teem with white fish*** (Coregonus albus), ***game in myriads frequent its shores, and can be easily got at in the numerous little nooks and bays. (Horetzsky 1874:20-21)***

The Canadian explorer-geologist George Dawson (1881) was also suitably impressed, observing that:

> ***At the time of our visit [mid-October 1879], the whole vicinity of Slave Lake was populas with wild fowl on their way southward — ducks of several species, geese, cranes, and swans. As will be noted below, the lake is still an important water fowl area, particularly on the west end, where there are large weed areas which provide excellent habitat.***

Summary of Current Biophysical Data

FLORA

Except for the west end of Lesser Slave Lake, which is Aspen-Parkland, the study area lies in Rowe's mixedwood section of the boreal forest (Rowe 1972:36). This classification includes typical species such as trembling aspen, balsam poplar, white and black spruce, and paper birch. The region west of the lake is called aspen grove and is characterized by stands of aspen-poplar that were formerly interspersed with grasslands; aspen groves are still common, but they are now dominated by large expanses of cultivated land. A local resident of the Grouard Mission area on Buffalo Bay stated that his father, who was a local ranger, recalled that during the 1930s the bush was regularly burned by the local aboriginal population, thus maintaining the grassland from Grouard to south of High Prairie (Duane Nichols, pers. comm., 1988).

In more specific terms the flora includes a variety of berry plants that would have been of value to human consumption. Varieties observed in the vicinity of the Slump site included wild strawberry, saskatoon, gooseberry, raspberry, high bush cranberry, and choke cherry (Schweger pers. comm., 1988; Zutter n.d.); hazelnut trees are also found in the site area. Finally, an inventory of less obvious plants of use to humans was undertaken by one of the field school students of aboriginal descent. He collected plants from the site area and, working with an elder from his home community of Calling Lake, Alberta, was able to Identify 32 species of useful plants (Johnson n.d.). Some of these also have multiple uses; e.g., the fungus growing on birch can be used as tinder in starting fires, and another type of fungus on the local willow is used in ceremonies[3].

FAUNA

Biophysical data show historical continuity in most categories of fauna; the most obvious changes would be the disappearance of bison in the 19th century. Historical documents record the presence of bison in the vicinity of the forts on Buffalo Bay and local residents have also mentioned evidence of the former presence of bison. For example, a farmer in Big Prairie Settlement north of Buffalo Bay said that when he and his family arrived in the area in 1916, there were scattered piles of bison skulls over their homestead (Maryon Cox pers. comm., 1981); he also stated that ever since he could remember (in 1981, Mr. Cox was in his late 60s-early 70s), the area north and west of Buffalo Bay was prairie with small thickets of poplar. Another farmer told us that bison skulls could be found fairly often around springs or seeps located in the bush on the south side of Big Prairie, a prominent ridge feature that extends west from the Buffalo Bay area (E. Hendry pers. comm., 1980).

Soper (1941) indicates that other ungulate species in the area include wapiti, white-tailed and mule deer, and woodland caribou. Curiously he does not mention moose, which is now a significant species in the region. Data reported for the late 1960s, for example, indicated that 2,341 moose were harvested in the Lesser Slave Lake region. In addition, it was estimated that the Swan Hills country south of the lake could support about 5,600 animals, "and the area north of Highway 2 for 200 miles is estimated to support another 11,600" (Alberta Indian Development n.d.). Other mammal species include black and grizzly bear, wolf, red fox, marten, beaver, porcupine, muskrat, woodchuck, and hare.

Waterfowl, including varieties of ducks and geese, are fairly well supported by the lake. Land inventory maps indicate a Class 2 capability; i.e., "...very slight limitations to the production of waterfowl," for the shores of the western half of the lake, and especially for the extreme western portion and Buffalo Bay (Land Capability for Wildlife 1970a; Land Capability for Wildlife 1970b). In contrast, the eastern portion of Lesser Slave Lake is considered to be poorly suited for wildlife production because of poor habitat. Pelicans spend the summer on the north end of the Swan River delta and can often been seen in the Buffalo Bay locality as well.

Lesser Slave Lake continues to be noted for its fishery resource, both for sports fishing and commerical purposes. Land inventory maps indicate a Class 2 rating ("few or minor limitations on sport fish production"). Significant species include lake trout, mountain whitefish, jackfish, grayling (only in eastern streams), perch and walleye (Alberta Land Inventory n.d.).

In summary, the Lesser Slave Lake region is well-endowed with the resources that would have been important to sustained prehistoric occupation. Indeed, relative densities of archaeological sites, may reflect this differentiation between the east and west portions of the Lake. I will return to this aspect of land-use in the concluding chapter.

CHAPTER 2

Study Area Reconnaissance

Previous Archaeological Work

Prior to the research reported here there had been virtually no intensive archaeological work done in the Lesser Slave Lake region; however, there had been sporadic surveys since the 1960s. A few sites, for example, were reported during the mid-1960s on the east end of the lake (GiPq-1, GiPr-12) during an extensive survey of northern Alberta by J.V. Wright and W.C. Noble; only a few artifacts (spalls or flakes) were found at each locality (CHIN[1] site files). R. Gruhn also recorded a site, in this case on Shaw Point, during the same decade as the Wright and Noble survey. In the early 1970s several sites were recorded in and around Lesser Slave Lake Park (GiPr-1 to 11; GjPr-1, 2) on the east side of the lake as part of a Provincial Museum of Alberta inventory. These sites included one with a Pelican Lake type projectile point, two sites with hearths but no artifacts, an historic cabin, and occasionally some butchered bone was observed; many of these sites were disturbed. A few sites were also recorded on the west side of the study area at Shaw Point (GiQa-2; a disturbed scatter), at the north end of the bridge to Grouard where the historic Grouard Settlement was located (GjQa-2), and there was a private collection (unavailable for this study because of loss) from a farm in the northwest section of the study area (GjQc-1; an Oxbow point) (CHIN files). Two heritage management projects were also completed during the field work phase of our research (French 1979, 1980; Fedirchuk 1980, 1981), and involved historic resource impact assessments along the Slave River just east of the town of Slave Lake, and in Lesser Slave Lake Provincial Park, respectively. Four new sites (GhPq-4 to 7) were found during the former project, including two isolated finds and two small lithic scatters. The latter study added six sites to the record (GiPz-3, GiPr-13-16, GjPr-3). Most yielded only flakes, two were disturbed and there were no diagnostic tools.

As there were few known sites in the Lesser Slave Lake region and large areas were completely unexplored, a wide-ranging reconnaissance was necessary to develop baseline data of site distribution, to provide indications of the nature of artifact assemblages, and to locate sites suitable for systematic excavation. This chapter provides a summary of the areas examined during this phase of the project, as well as some additional information on specific sites, and illustrations of select artifacts. Appendix A provides tabular summaries of the characteristics of the sites found, artifact inventories, and raw material frequencies.

Reconnaissance required the use of a boat, vehicle, and foot traverse prospecting techniques in various combinations. Boat survey was necessary along most of the northern shore of the lake east of Hilliard's Bay Provincial Park, because this area has remained almost completely undeveloped. Areas along the southern and eastern shores and the region around the northwest portion of the lake could generally be approached by vehicle along existing highways, secondary roads, cleared section lines or logging roads. Dense bush made it necessary to use laborious, time-consuming shovel testing to probe for cultural remains. However, few sites would have been found along the north shore without this effort.

Survey was made easier in the northwest area around Buffalo Bay because of the presence of cultivated land, some of which was in summer-fallow on terrace systems that appeared to have good archaeological potential. The downside of this situation, however, was that all of the sites recorded for this area were disturbed. There were also local artifact collectors, usually farmers with items collected from their fields. These people provided information regarding their own finds and advice that led to other sites and collections that would not otherwise have been found. Indeed, this source of data provided the only indication of very early occupation in the Lesser Slave Lake region in the form of early projectile point forms (Figures 21-22).

Where possible, survey traverses followed ancient strandlines, particularly in the cultivated land west of Grouard Mission around and west of Buffalo Bay.

North Shore

The north shore is defined as including all of Shaw Point and the shoreline and adjacent terraces extending eastward to the mouth of Marten River, which marks the northern boundary of Lesser Slave Lake Provincial Park. The north shore is almost entirely undisturbed. The only exceptions are Shaw Point, which has been in continuous use since the early 19th century; the narrow (c. 2 m wide), late-19th century Grouard Trail that winds along the north shore and formerly joined the towns of Slave Lake and Grouard, a small Métis settlement at Big Point (see Appendix B); a few isolated trappers' cabins; and Hilliard's Bay Provincial Park. Remnants of the Grouard Trail were evident at a number of locations along the first lake terrace, and its construction and use was quite possibly responsible for disturbance of many sites located in the same areas.

The north shore is a heavily forested, rather featureless shoreline with few points of land, bays, or river mouths. In short, it has almost none of the topographic features that would be recognized by most boreal forest archaeologists as suitable areas for survey. The only exceptions to this situation are Shaw Point, Big Point, the large point on the north side of the Narrows, and the mouths a few small creeks.

In addition to the homogeneity of the shoreline, there were also access problems caused by long sections of shoreline with extensive areas of shallow, muddy foreshores that were covered with broad expanses of weeds. These weed beds extended up to 200 m offshore and made boat access to potential survey areas a particularly difficult, not to mention tedious, task. This situation was aggravated during the last two seasons of fieldwork in the early 1980s when water levels in the lake dropped considerably. The sections of the north shore that were affected extended from the east end of Hilliard's Bay Provincial Park to Cut Bank, from here more-or-less continuously to Big Point, and from this area to the Narrows. An aerial overflight indicated the same situation applied to large sections of the remaining shoreline to Marten River.

The weed situation fluctuates, however. During a visit to the lake in 1979, for example, water levels were found to be high enough virtually to eliminate them in the Hilliard's Bay area. Hydrographic data covering the period from 1914-1977 (Nemanishen and Cheng 1978:1) and statements by local residents indicate that lake levels have been much lower as well. In fact, the northern portion of the Swan River delta and the flats west of Buffalo Bay were extensive hay fields before flooding occurred in the late 1930s (F. Madsen, Faust, AB, pers. comm.,1980; M. Cox, Big Prairie Settlement, Alberta, pers. comm., 1980). These areas are now being partially reclaimed, and hay is once again being harvested. Such long-term fluctuations in lake levels may have made the use of certain shore areas less desirable for pre-contact occupation, especially if local access to fish resources was a necessary requirement. There are also implications for site discovery as significant numbers of sites located close to lower lake margins (assuming some degree of stability of lowered lake levels) would now be submerged. In this regard, a pre-contact/contact site found in the shallow water off the north end of the south side of the Narrows (GiPu-3) demonstrates this possibility.

The most intensively surveyed portion of the north shore was in the Shaw Point to Cut Bank section (Figure 3 and Figure 4). This involved the examination of present and, where possible, former terraces. Because of the heavy vegetation cover, it required foot traverses and shovel testing, usually at 50 to 230 m (approximately) intervals. Several sites were found along this stretch, including GiQa-3 to GiQa-20, GiPx-3, GjPx-6 and GjPx-10 to GjPx-13. GiQa-3, or the Slump site received the greatest amount of excavation during the project, followed by GjPx-6, or the Hidden Creek site.

Survey on Shaw Point proper was made easier by the presence of many exposures on the main point area, which consists of a sandy gravel west shore, and a dune covered interior and east shore. The exposures have been created most recently by constant and increasing recreational use over the past several decades and have been maintained and modified by the effects of winds and shifting sands. Unfortunately, this activity and the fact that the point was used as a fishery in the 19th century, have probably also been responsible for the destruction of many sites. At the least, there has been serious degradation of the sites that were discovered during our survey. The same is also unfortunately true of the northern and northwestern portions of the point since these areas have been used as a private sand and gravel quarry operation for many years. This area is now a privately owned campground whose increasing popularity since the mid-1980s is of concern because of expansion into undisturbed areas around the original quarry.

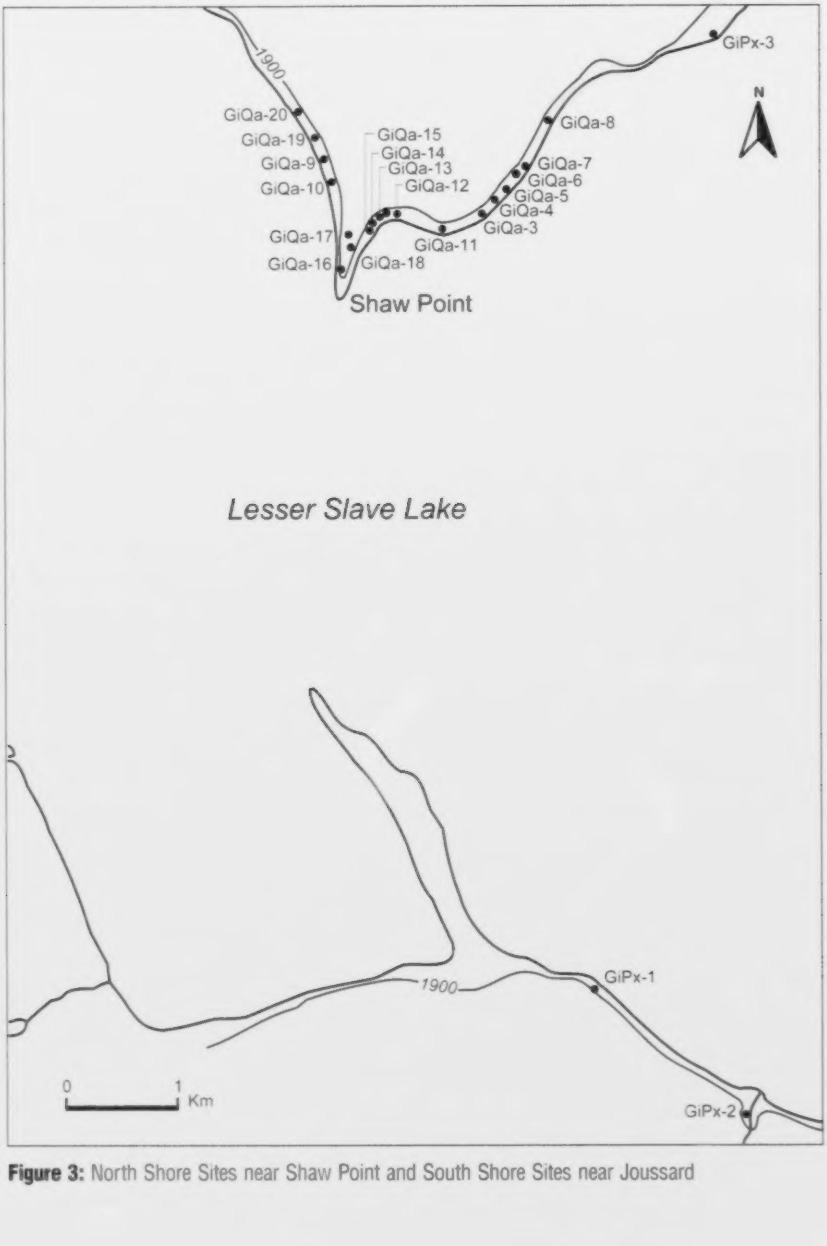

1900
GiQa-20
GiQa-19
GiQa-9
GiQa-10
GiQa-15
GiQa-14
GiQa-13
GiQa-12
GiQa-17
GiQa-16
GiQa-18
GiQa-11
GiQa-8
GiQa-7
GiQa-6
GiQa-5
GiQa-4
GiQa-3
GiPx-3
N
Shaw Point
Lesser Slave Lake
1900
GiPx-1
GiPx-2
0
1
Km

Figure 3: North Shore Sites near Shaw Point and South Shore Sites near Joussard

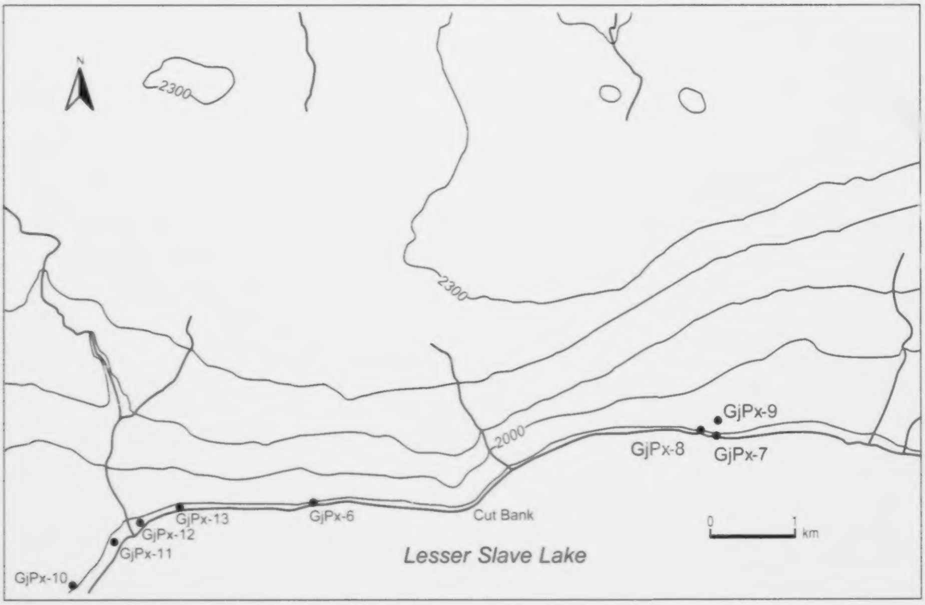


Figure 4: North Shore Sites in the Cut Bank Area

Select sections of higher terrace systems were also examined, depending upon accessibility and the direction of survey traverses. The latter occurred when terrace systems merged or disappeared and higher benches could be recognized and followed. Dense bush often made it difficult to see which terrace bench was being inspected or its distance from the shore, particularly in the section between site GiQa-3, to GiQa-8.

Access to specific sections of terraces could occasionally be obtained by following logging roads that ran parallel to, and approximately 2 km north of the lake-shore, then following cut-lines running south to the lake. This method was used at one location in the Cut Bank to Big Point area where three sites were found (GjPx-7-9). The cut-line from the logging road (more a track than a road) crossed several, apparently higher shorelines as the modern lake-shore was approached. About 200 metres from the lake the cut-line ended on a well defined terrace system where the lake was just visible through the intervening heavy bush; two additional sites were found on this terrace.

Farther afield a boat was used to inspect specific locations between Cut Bank and Big Point. Two sites (GiPv-2, 3) were found in dune areas west of the mouth of Shaw Creek. There were also recent remains, including a cabin, and the wreck of a small fishing boat with a rusted single cylinder marine engine. A longer second trip was taken to Big Point (Figure 5), where a temporary base camp was established to carry out a more prolonged investigation of the area. Four pre-contact sites were found on the first terrace above the present lake level (GiPv-4 to GiPv-7). In addition, our camp was located in a clearing associated with a small abandoned pasture of approximately five acres. The clearing had several buildings, including residences (cabins), farm buildings, an ice-house, and two depressions representing the foundation remains of former cabins. We also found a cemetery, which according to a Métis elder who visited the location one evening on a trip from Joussard, was used in 1918, and had several victims of the worldwide flu-epidemic dating to that time. As the focus of this study is pre-contact history, only brief summaries and pictures of the structural features found at Big Point are included in Appendix B.

Finally, we were able to examine the very large point on the north side of the Narrows, in the approximate middle of the lake (Figure 6). This visit required a departure from a small lake-side cottage resort on the northwest corner of the large peninsula on the south side of the Narrows, which is the delta of the Swan River.

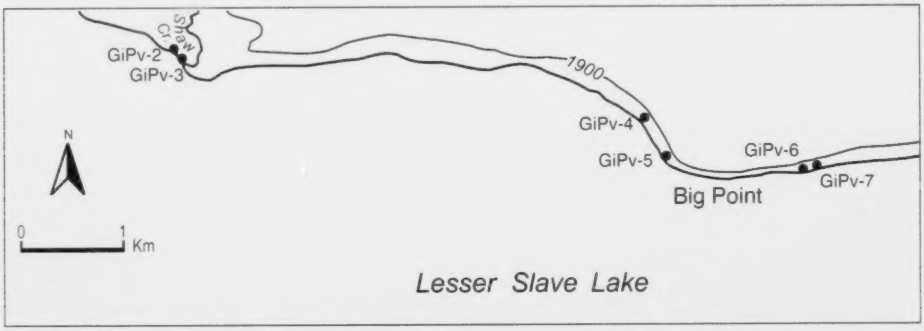


Figure 5: North Shore — Shaw Creek to Big Point Sites

The hour long trip was rather harrowing in our small open boat. After landing, we initially walked north up the west side of the point following the Grouard Trail for 2-3 km until it ended in a low boggy area. We therefore returned and examined a section of the trail where it turned east across the approximate middle of the point following an ancient sandy beach. Two sites (GiPu-1, 2) were found along the trail that consisted of heavily disturbed surface scatters. Testing in undisturbed area adjacent to the first scatter (GiPu-1, four pits) was unproductive. Debris at the second site stretched over about 50 m of the trail in a very thin scatter, so no testing was carried out.

Buffalo Bay and South Heart River

The northwest region of the survey area includes: (1) the terraces overlooking the channel connecting Lesser Slave Lake and Buffalo Bay from the former town of Grouard, to its present location at Grouard Mission; (2) the high and low terraces overlooking the South Heart River, in Heart River Settlement; (3) the terraces overlooking the flood plain of the South Heart River on the south side of Big Prairie Settlement; and (4) higher terraces on the slope of a large ridge running through the north half of Big Prairie Settlement (Figure 7). I have also included in this section, two sites in Salt Prairie, located in the "hinterland" northeast of Buffalo Bay (GkQb-1, GjQa-8).

Reconnaissance in these areas was helped by the presence of roads; excellent exposures afforded by cultivated fields, many of them in summer-fallow during our work; and farmers with private artifact collections and/or knowledge of other local people who knew of sites or who had collections that produced a few diagnostic projectile points.

The segment from the old Grouard town-site to Grouard Mission appeared to have excellent potential, as there were lower and intermediate terraces, ranging from about 1900-1950' above sea level. The sites found here included GjQa-3 to 7. The location of GjQa-3 was initially thought to mark the point where the intermediate, 1950' terrace swung away from its western overlook of Buffalo Bay, to continue east, more-or-less paralleling the channel connecting Buffalo Bay and Lesser Slave Lake (Figure 8). However, the southern aspect of the terrace face had been bulldozed, and it appeared that the area south of the slope had served as a borrow pit for local highway construction of a by-pass around Grouard Mission. The flat terrain backing the terrace also appeared to have been heavily disturbed by construction equipment.

Although destroyed, the site was of some interest, because among the 10 artifacts found there were two flakes of a distinctive welded or fused tuff. This is an exotic material that is believed to originate from a single source in the Tertiary Hills, which are outliers of the Mackenzie Mountains, N.W.T., located south of Fort Norman, Northwest Territories roughly between 64° and 65° N; (Cinq-Mars 1973a, b). In the early 1970s, Cinq-Mars reported that this material occurred in a "minimum of 50 sites" throughout northwest North America with a distribution extending from the "central District of Mackenzie almost to the Alaska-Yukon boundary" and from the "tree-line in northern Yukon and the Northwest Territories, to the Cordilleran foothills in the Liard River area" (Cinq-Mars 1973a:E13). Ives and Hardie (1983) have summarized evidence of the occurrence of this material in northern Alberta sites, including the flakes from GjQa-3, which have been confirmed by Cinq-Mars as welded tuff (now referred to as Tertiary Hills Tufaceous Clinker [THTC] by Cinq-Mars pers. comm., 1995). The other specimens, both of which are from the Birch Hills in northeastern Alberta, include a flake from HkPa-4 (Eaglenest Portage site; Donahue 1976b; Ives 1985) and a lanceolate biface from HjPd-1 (Gardiner Lake Narrows site). The flakes from GjQa-3, as well as a single flake from a site on the south side of the lake near the town of Faust (GhPv-1) extend the north-south distribution of THTC by several hundred kilometres, and, as pointed out by Ives and Hardie, this is some 1750 km south of the source in the Northwest Territories.

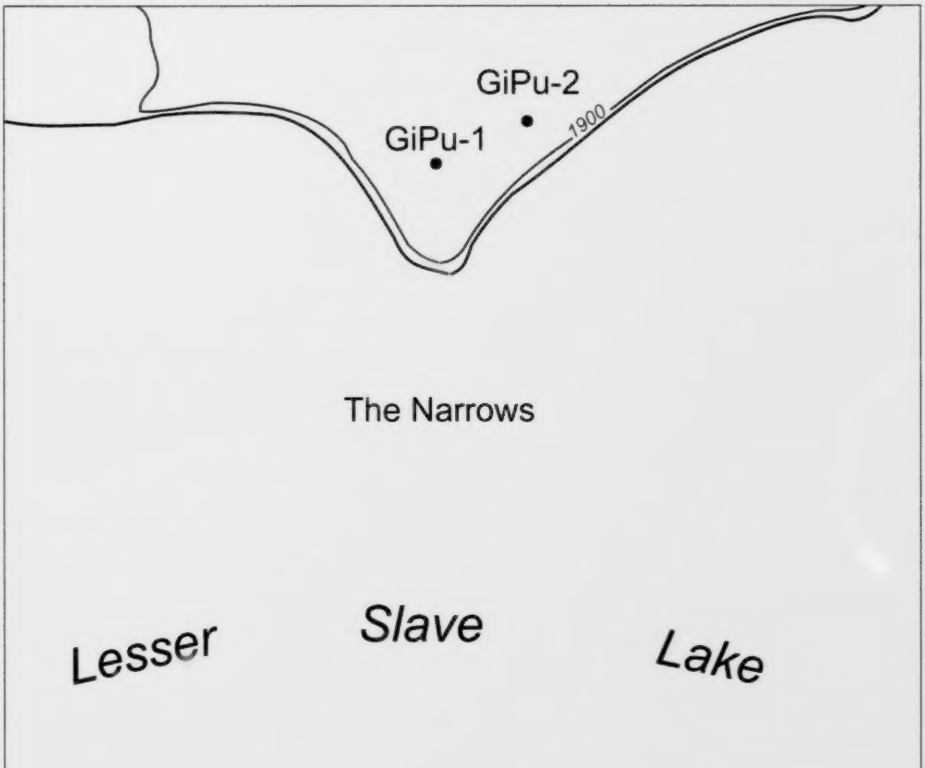

GiPu-2
GiPu-1
1900
The Narrows
Lesser
Slave
Lake
GiPu-3
1900
N
0
1
Km

Figure 6: Sites in the Narrows Area of Lesser Slave Lake

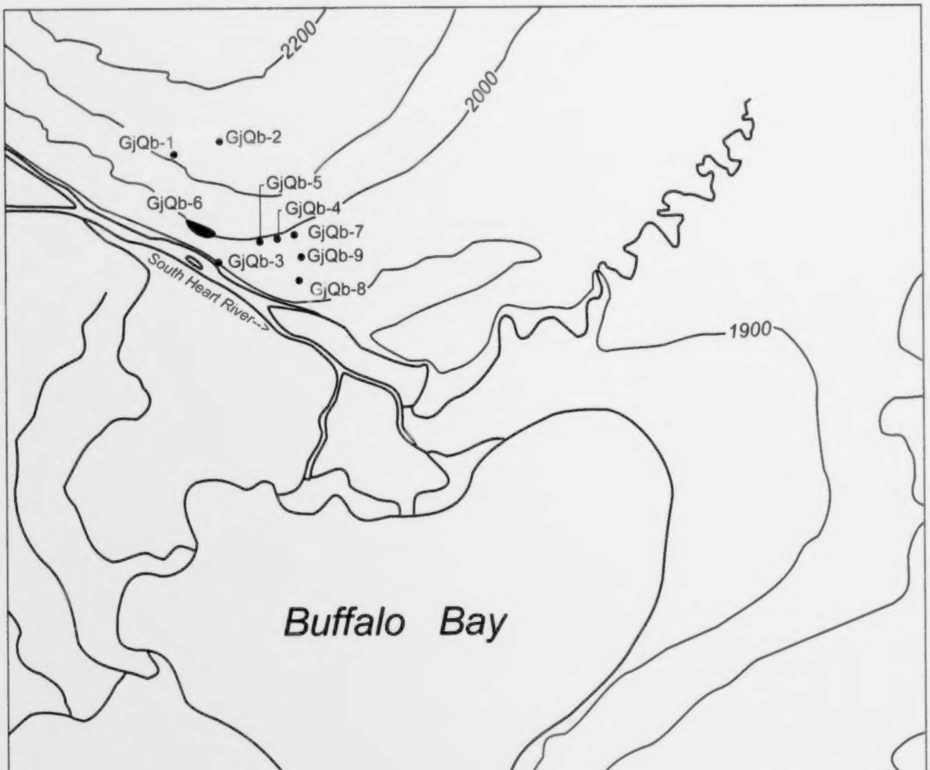

2200
2000
1900
2000
GjQb-1
GjQb-2
GjQb-5
GjQb-6
GjQb-4
GjQb-7
GjQb-3
GjQb-9
GjQb-8
South Heart River-->
Buffalo Bay
GjQa-5
GjQa-4
GjQa-6
Grouard Mission
GjQa-7
GjQa-3
N
0
1
Km
Old Grouard
Lesser Slave Lake-->

Figure 7: Buffalo Bay Area Sites

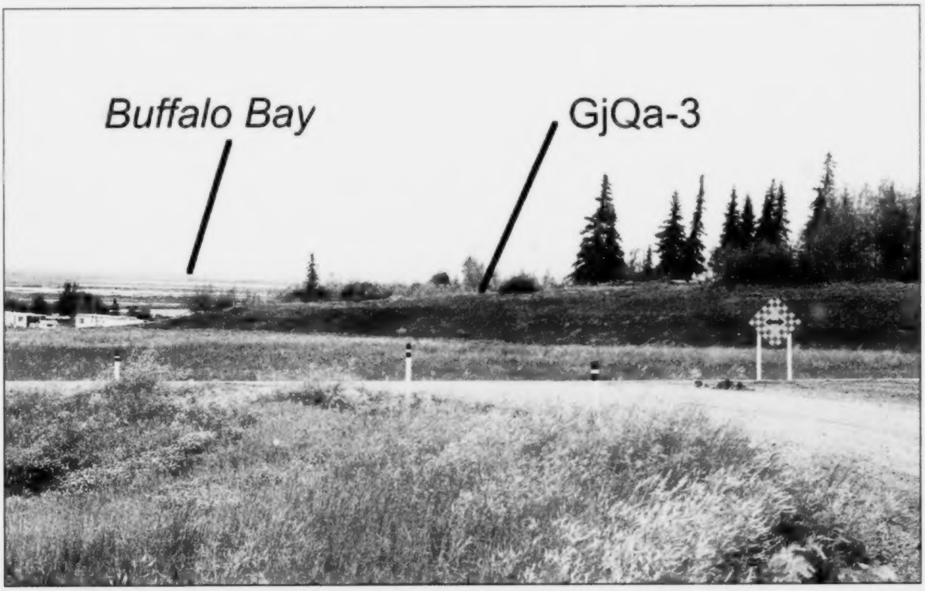


Figure 8: Location of Tertiary Hills Tufaceous Clinker Flakes at GjQa–3 looking Northwest. Buffalo Bay in Background

The remaining sites in this section were found on vehicle tracks (GjQa-4, 6, 7), either on the intermediate terrace (GjQa-7), or on the lower terrace where the tracks crossed the terrace edge (Figure 9). One site, GjQa-5, was found along a section of track that had recently been bulldozed. Among other things, the assemblage included a small nondescript biface. Testing suggested some intact deposits east of the disturbed area, but only one pit was productive. Given the intensity of historic period occupation of the town since the early 19th century (e.g., a Roman Catholic Mission, North West Company and Hudson's Bay Company posts, farming, mission school, vocational college and village), there is likely to be little left of the pre-contact occupation of the area. Indeed, the location of the original Hudson's Bay post was obliterated by the construction of a village water reservoir in the 1970s.

Eight sites were found in the Heart River Settlement area located north of the mouth of the Heart River on Buffalo Bay (Figure 10). These localities were situated on the first terrace on the floodplain (GjQb-3, 8, 9), on a second terrace about 30 m higher at 2000' asl that also overlooks the river (GjQb-4 to GjQb-7), and at the point where a north-south gravel road begins to descend to a farm on the floodplain of the South Heart River (GjQb-1, 2). All sites in this area consist of small lithic scatters with one to 11 artifacts, most of which consist of flakes and shatter; one site, GjQc-5 also had a lead musket ball.

Fourteen sites were found in the region of Big Prairie Settlement and the area just to the west of the settlement (Figure 11). Both areas lie north of a large expanse of

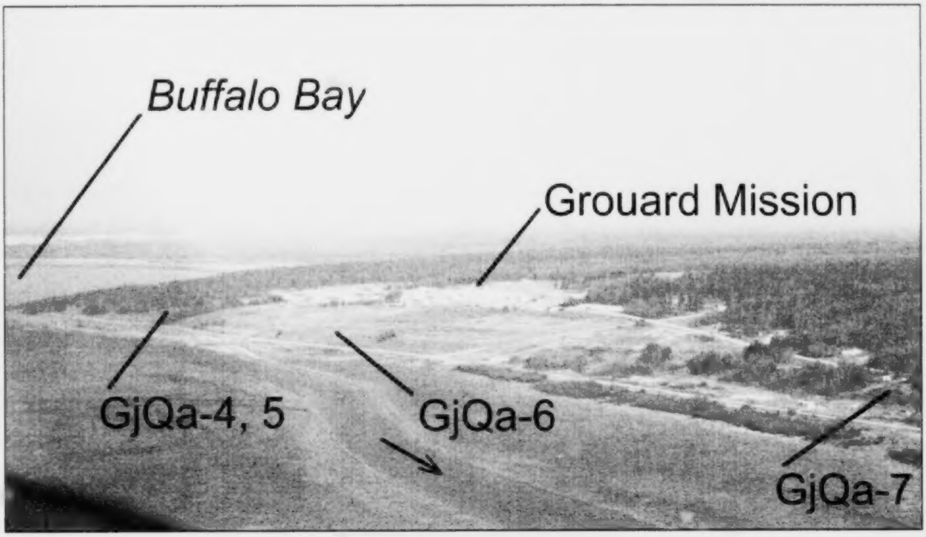

Buffalo Bay
Grouard Mission
GjQa-4, 5
GjQa-6
GjQa-7

Figure 9: View to North of Sites on Terraces in the Grouard Mission Area

wetland that is adjacent to the South Heart River. Several of these (GjQb-10; GjQc-4 to GjQc-6, GjQb-12 to GjQb-14) lie at approximately 1950' asl on what appears a part of the same terrace system as GjQb-4 to GjQb-6 (note, GjQb-10 is not illustrated). Of the remainder, GjQb-11 lies at approximately 1925' asl. The Borden designation to this site applies to the location of a grooved maul found by the landowner (based on a verbal description, but the object had been lost) on the floodplain of a small creek that runs though the quarter section, and a low ridge approximately 300 m southwest of the

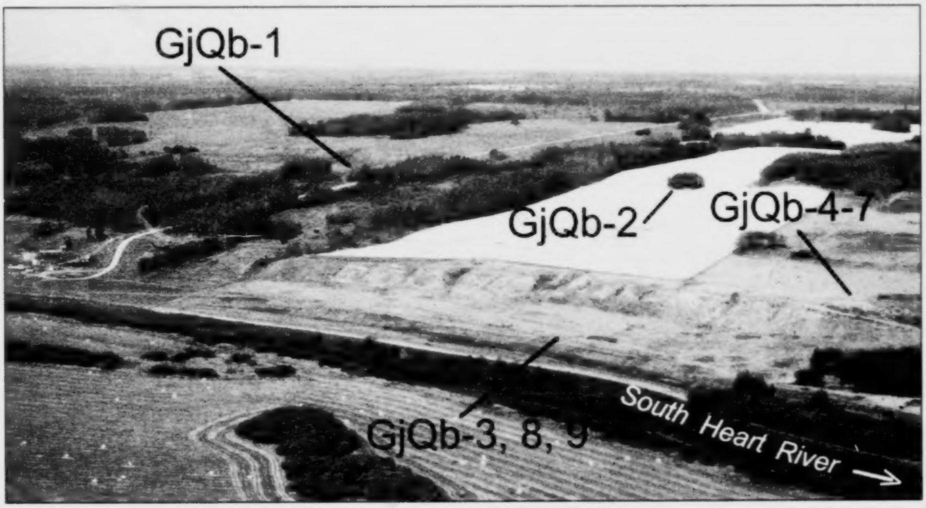

GjQb-1
GjQb-2
GjQb-4-7
GjQb-3, 8, 9
South Heart River

Figure 10: View of Terraces along South Heart River

maul find that may have been a strandline associated with a higher level of Lesser Slave Lake. The other sites were found at elevations between 1975 to 2100' asl (GjQc-7 to GjQc-10), but were not associated with any definitive terraces.

The most significant sites in the area are those found along the 1950' terrace (GjQb-10; GjQc-4 to GjQc-6, 12 to 14). Two of these (GjQc-5, 6), which were found in summer-fallow fields, produced the largest collections from the inventory phase of the project: 502 and 154 items respectively (Figure 12; Appendix A). Also, and perhaps as one would expect, they produced the greatest range of different implement categories (n=11 for GjQc-5, and n=9 for GjQc-6). For example, GjQc-5 yielded 26 scrapers, 15 bifaces of various sizes, five projectile points (Figure 14; Table 1), and some historic period material, including a crushed copper pot, a .45-70-40[5] cartridge case, and a glass bottle neck. All of the artifacts were found in a collection area approximately 1 km long by 100 m wide lying adjacent to the terrace edge, but the greatest density of material was found in the western 100 m of the collection area. Similarly, 12 scrapers and five bifaces were found at GjQc-6, although here too, the collection area covered several thousand square metres.

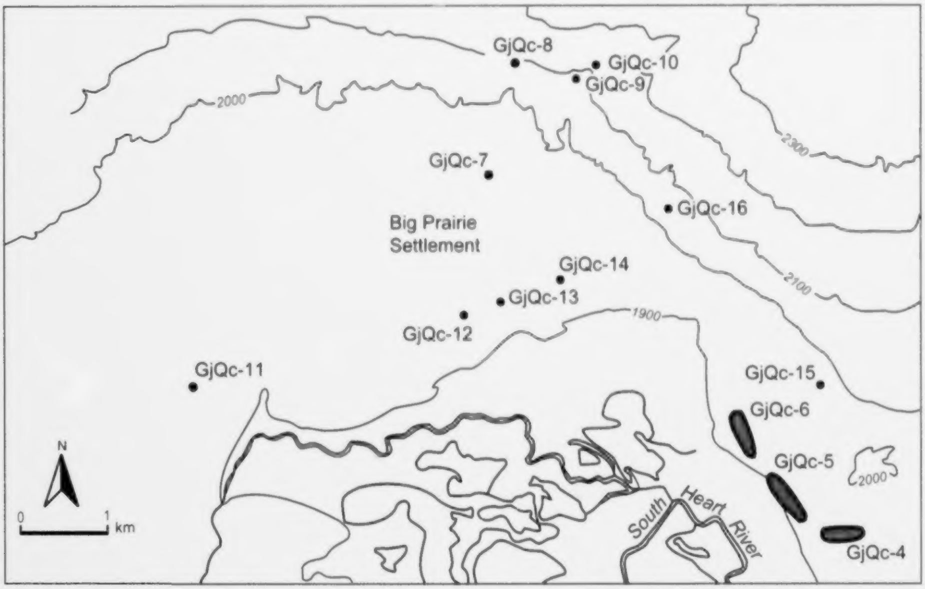

GjQc-8
GjQc-10
GjQc-9
2000
2300
GjQc-7
GjQc-16
Big Prairie Settlement
GjQc-14
2100
GjQc-13
1900
GjQc-12
GjQc-11
GjQc-15
GjQc-6
N
GjQc-5
2000
South Heart River
0
1
km
GjQc-4

Figure 11: Sites in the Big Prairie Area, West of Buffalo Bay

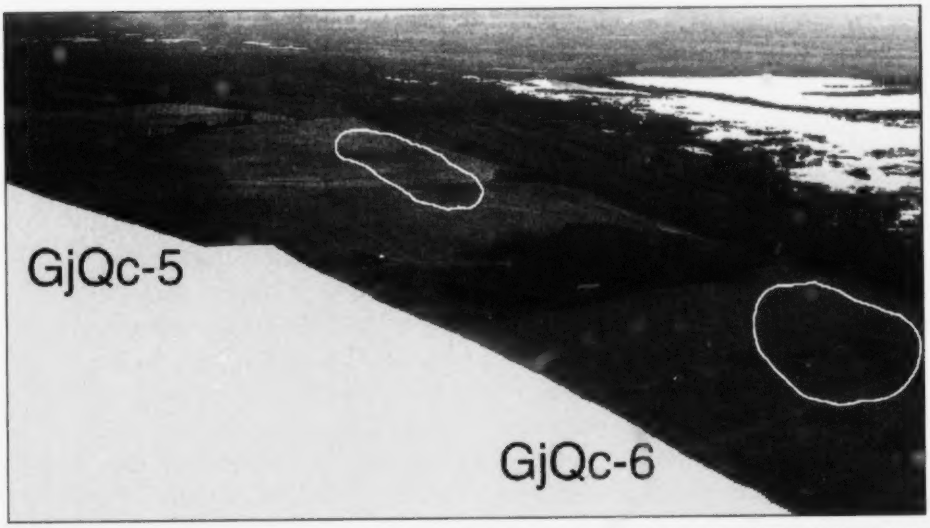


Figure 12: GjQc–5 and GjQc–6 Adjacent to Wetland, View East Towards Buffalo Bay. Greyed Area in Lower Left from Cropping of Aircraft Fuselage

Table 1: Basic Attributes for GjQc-5 Projectile Points

Cat. #	Form	Material	Len.	Wid.	Th.	Wt.	Comments
98	Side-notched	Quartzite	46.0	20.6	6.5	6.2	base ears and notches dulled
318	Side-notched	Vit. quartzite	38.7	21.0	5.7	4.6	notches dulled
440	Stemmed	Chert	38.3	23.8	5.4	4.9	stem and prox. edges dulled
96	Stemmed	Chert	54.9	19.6	7.1	8.4	
300	Stemmed	Chert	58.5	22.4	7.6	10.7	modern damage on right edge; stem edges slightly dulled

Points from GjQc-5 include examples (Table 1) comparable to Early (Figure 14d; cf., Gordon 1976: Plate 20a; Gordon 1996: Figure 6.4: KeNi-4c:4-153) and Late Taltheilei styles (Figure 14b-c; cf., Noble 1971: Figure 14c; Morrison 1984: Figure 3n). The stemmed example illustrated by Figure 14e is more difficult to identify because the proximal end of the stem not quite complete. It is probably reasonable to suggest that it too is Early Taltheilei. The side-notched example (Figure 14a) has some resemblances to Besant points, such as those illustrated by Reeves (1983: Figure 11) and Gruhn (1971: Plate IV-H, L).

The other site that warrants comment is GjQc-14, which was found on hillock overlooking a terrace bench. Among the 69 specimens found at this site were a large, but broken, notched obsidian point or knife and the bit portion of a ground adze; there were also four scrapers and the same number of bifaces. Aside from these, the collections ranged from seven to 12 items.

South Shore

Unlike the north shore of Lesser Slave Lake, large portions of the south side of the lake are intensively developed. There are several towns (e.g., Joussard, Faust, Assineau, Canyon Creek, Widewater, Wagner, Slave Lake) with their associated outlying farming and residential areas; campgrounds; the railway right-of-way, which runs beside the lake-shore in the eastern part of the lake (i.e., east of Canyon Creek); and large tracts of agricultural land, especially on the Swan River delta on the south side of the Narrows (Figure 13) and the Driftpile River Delta immediately to the east. As indicated earlier, survey along the south side of Lesser Slave Lake involved use of a vehicle to gain access to shoreline locations wherever possible through roads, and in one case, on the south side of the Narrows, section lines.

Two almost completely destroyed sites were found in the Joussard town-site area (GiPx-1, 2; seven and five artifacts, respectively; Figure 3). Farther east along the lakeshore is the town of Faust. Three sites were found in the vicinity as a result of referrals provided by farmers. The Madsen site (named after the owner, Mr. Frank Madsen), GhPv-1, was the most impressive in terms of the collection made by the owner on his quarter section, which lies along the modern lake-shore. The more notable aspects of the collection included a jadeite adze or celt and a tubular, steatite pipe (Figure 15), both of which were found near one another on the southwest corner of the property. Mr. Madsen was able to direct us to the approximate location of the finds, but there was no evidence of any other artifacts or indications of a possible burial (e.g., red ochre traces).

The adze is dark-green, but mottled with areas of lighter green and some yellow; overall, the tool has a greasy lustre. It is finely ground and polished, and has a straight, slightly asymmetric edge that suggests an adze bit, rather than an axe (l. 108.5 mm; w 51.6 mm; t. 16 mm; no weight recorded). Longitudinal groove facet remnants from blank production are clearly evident along the edges, indicating the blank came from a tabular slab that was sectioned by grooving, then snapped. The bit edge is still quite sharp, suggesting little use, or loss shortly after resharpening.

The pipe is a cylindrical tube, open on both ends and fairly thin-walled with a maximum thickness of 3.5 mm on proximal end and 2.6 on the distal. It is 77.7 mm long, and varies from 12.9 mm in diameter on the proximal end, to 20.5 mm at the distal. From about one-third of the maximum length, the body begins to taper for

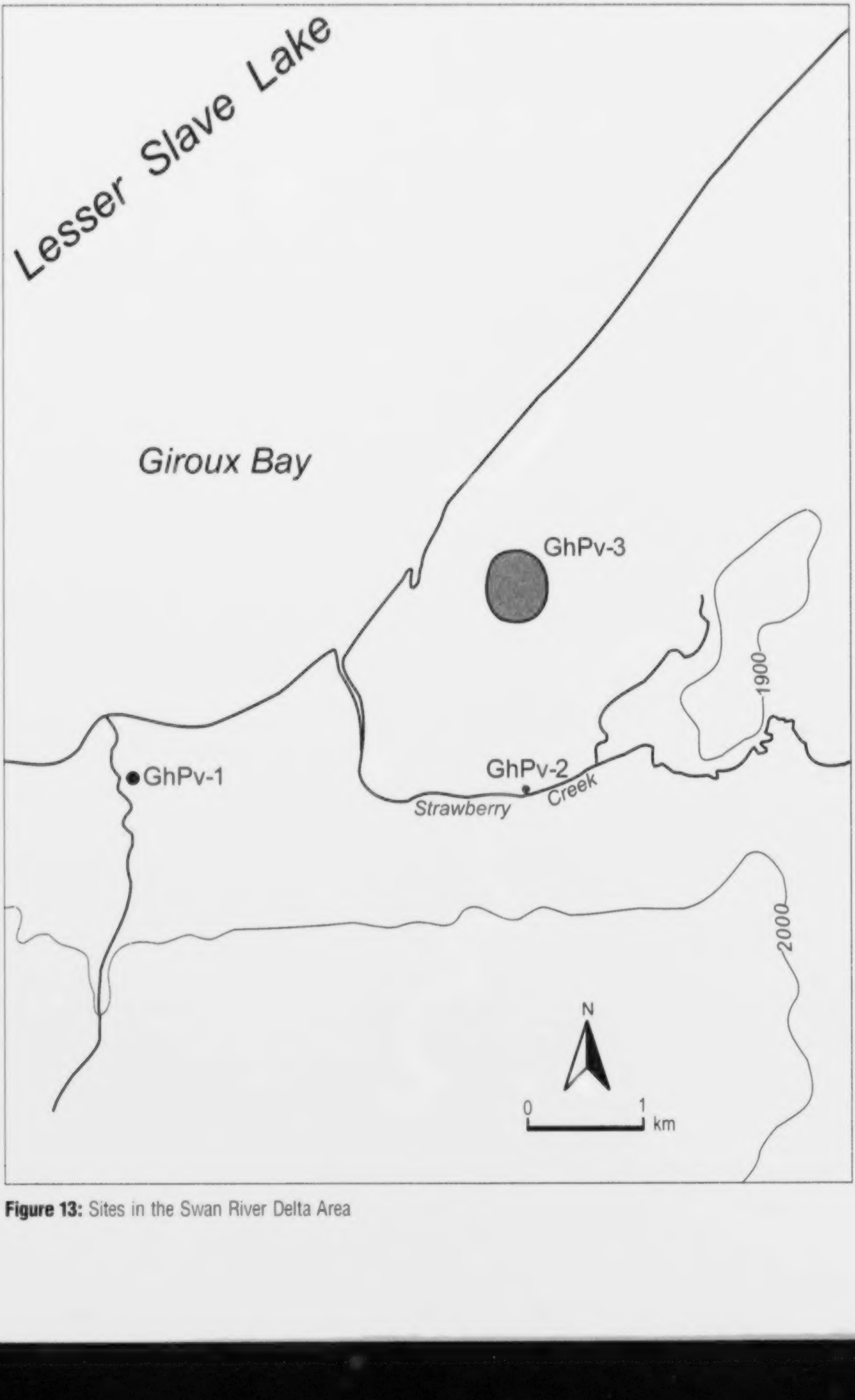

Lesser Slave Lake
Giroux Bay
GhPv-3
GhPv-1
GhPv-2
Strawberry Creek
1900
2000
N
0
1
km

Figure 13: Sites in the Swan River Delta Area

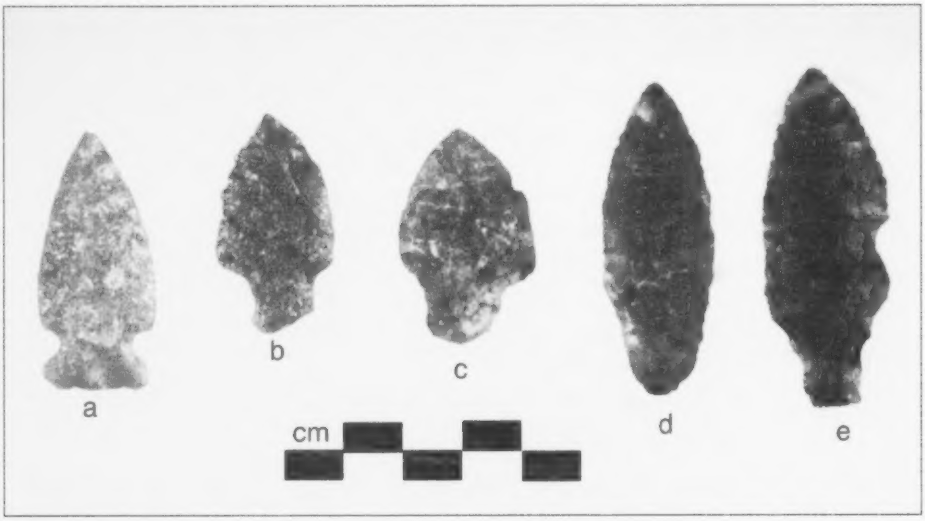


Figure 14: Projectile Points from GjQc–5: (a) 98; (b) 318; (c) 440; (d) 96; (e) 300

about two-thirds, then becomes parallel-sided at a slightly smaller diameter for the remainder. Surfaces have been ground smooth and slightly polished (descriptive details for the pipe and adze, courtesy of B. Dawe, Provincial Museum of Alberta, Edmonton)

The jadeite adze is clearly an exotic, both in terms of raw material, and as a finished tool. It most likely originated in British Columbia where they are fairly common (Mackie 1995). There are also sporadic occurrences of these tools in Alberta. Wormington and Forbis (1965: Figure 42), for example, illustrate an example from the Red Deer area, and there are a few in private collections from the Peace River country (Archaeological Society of Alberta n.d.:19; two examples, one from Wembly, the other from Woking; p. 68, from La Glace; p. 69, from Dimsdale). According to Forbis (1970:40), pipes made of soapstone (i.e., steatite) are occasionally found in Alberta, although "...generally in wooded country and not in the Plains." He reports specimens from the Peace country, near Edmonton, and Camrose, but notes that the age and affinities of these objects are unknown. A tubular example is illustrated (Forbis 1970: Plate 13), but it exhibits an incised decoration and is more rounded in appearance than the Madsen site example. Since the publication of the Forbis synthesis, a tubular pipe has been found in archaeological context on the Plains. It comes from a McKean complex level at the Cactus Flower site (EpOp-16), which is located in the Suffield Military Reserve north of Medicine Hat (Brumley 1975:59-60, Plate 33B). The specimen's material is unknown and it is broken longitudinally. However, the diameter (33 mm), which is considerably larger than the Madsen site pipe, suggests a more massive example.

Steatite, which is rather rare in Canada, occurs in sources near Banff, Alberta (Spence 1940).

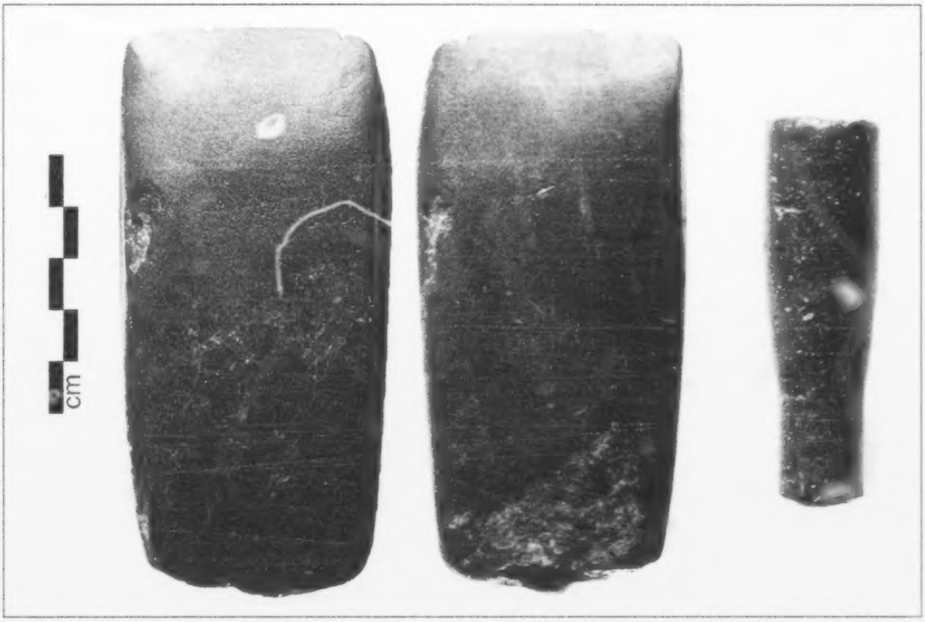


Figure 15: Jadeite Adze (Obverse/Reverse) and Steatite Pipe

There were also numerous rectangular, square, or ovoid shaped celts, some of which were "waisted" or laterally notched. All of these were made on quartzite cobble spall blanks. A sample of these implements is shown in Figure 16. No other site in the region produced such a large sample of this tool type. A similar example was found at the Slump Site, and two other specimens were collected by a farmer from a site (GiQf-4) located approximately 30 km east of the town of High Prairie. A sample of 29 of the Madsen collection celts was borrowed for study. There is a fair range of sizes: weights, for example, vary from 138.3-954.2 g, and lengths from 72.0-183.8 mm. In the three illustrated on Figure 16, the top example weighs 138.3 g (l. 147.9 mm; w. 86.3 mm; t. 39.7 mm; the middle specimen is 560.6 g (l. 155.7 mm; w. 95.7 mm; t. 27.8 mm), the bottom tool is 478.1 g (148.9 mm; w. 86.6 mm; wt. 34.3 g).

MacNeish illustrated a chopper from a site (KfVh-1; reassigned KfVi-1) located on the Yukon River west of the town of Minto in southern Yukon. The chopper is nearly identical with several from the Madsen site (MacNeish 1957: Plate IV, 4). He refers to the Yukon examples as "biface choppers" and notes that they are "almost entirely confined to the Taye Lake Horizon" (MacNeish 1957:34, Figure 92, 1), which has since been revised by Workman (1978) into the Taye Lake Phase (4,000-1,500 BP), a part of the Northern Archaic Tradition in Southwest Yukon. However, Workman does not illustrate artifacts comparable to the Madsen specimens, (nor does he have a category for choppers) although drawings of two "edged" cobbles may be comparable

(Workman 1978: Figure 53b, d). MacNeish also shows a laterally notched cobble or cobble spall (MacNeish 1957: Plate VI, 6) that was found near the town of Aishihik in southern Yukon. He identifies this as a "net sinker." These are a common artifact type in Northern Archaic Tradition (6,000-1,000 BP) sites (e.g., Anderson 1988), particularly at the Onion Portage type-site on the Kobuk River in northwest Alaska. They are thought to indicate net fishing technology, where these objects served as weights for seine nets. A similar function could be inferred for the Madsen site specimens given the lake-side location.

However, laterally notched tools are ubiquitous on the Alberta Plains where they have been called "dog hobbles" (Wormington and Forbis 1965:107 and Plate 40a), presumably because they had something to do with restricting the movements of dogs used as pack animals. The term is not specifically defined by Wormington and Forbis, however, and to my knowledge there has not been any analysis of the objects to assess their function. Nonetheless, it seems improbable that these objects would have been used for net-fishing on the Plains. It is more plausible that choppers where used as bits in hafted tools that were suitable for processing bison carcasses (e.g., breaking bones for marrow and grease extraction).

Closer to home, Gruhn (1981: Figure 26c) illustrates an "adze blade" from a site on Calling Lake (GhPh-103), east of the study area, that has definite parallels with the Madsen celts. The age is not definitive, but diagnostics in the site suggest a possible Middle to Late Prehistoric Period presence (Gruhn 1981:92).

The Madsen collection also included several projectile points of various styles. One example may be Early Taltheilei (Figure 17b; cf., Gordon 1976: Plate 20a), and others are probably Late Taltheilei (Figure 17c, e-h; cf., respectively: Morrison 1984: Fig. 3a; Noble 1971: Fig. 15a, 14d; Morrison 1984: Fig. 3d, n; Noble 1971: Fig. 17a). Although broken, the point shown in Figure 17d could be a Besant type. No measurements were made when the points were photographed on Mr. Madsen's cabin floor.

There were also literally "buckets" (in Mr. Madsen's words) of cobble spalls, flakes, and various tools he had collected over the years. According to Mr. Madsen, aside from the specific locus of the pipe and adze, most of the artifacts were found scattered over the quarter section, with only a slight tendency for artifacts to be found adjacent to a creek running through the property, and on a sandy ridge near the lake.

While at the Madsen farm, we met another farmer, Mr. Bill Karpa, who owned the property to the east. He had a small collection of artifacts from a relatively flat field with a low ridge or rise about 1 m above the remainder of the field. The area is about 0.5-1 km from Lesser Slave Lake on the proximal end of the Swan River Delta. The area was under water during the high water period in the early 1970s. Mr. Karpa's collection included a few quartzite cobble spalls and bifaces, and our inspection of the collection area resulted in a few additional spalls. We also noted a diffuse scatter of fire-cracked

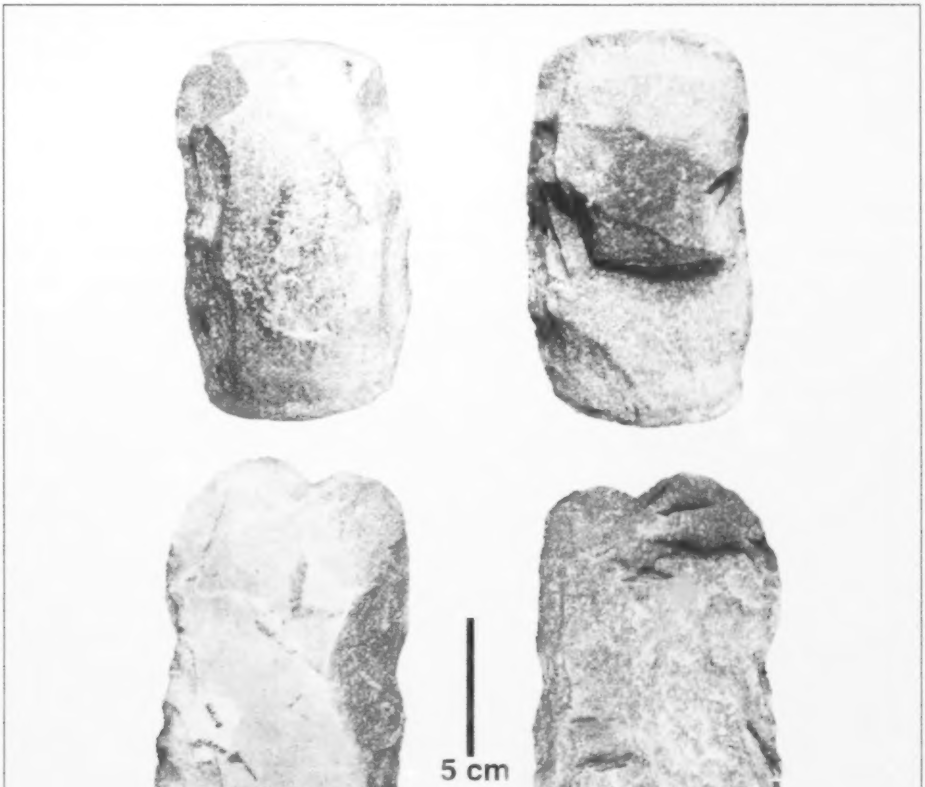


Figure 16: Sample of Celts (obverse/reverse) from the Madsen Site

rock in an area about 30x30 m, but not enough to suggest the presence of a well-defined occupation area.

A second site was (GhPv-2) was found on the Karpa property in a fallow field along the right bank and 3 m above Strawberry Creek (Figure 13). Mr. Karpa had found a rather crude quartzite biface in the area. Several other artifacts, mainly flakes, a core and a scraper, all of quartzite were found in a narrow strip, about 75 m long and 25 m wide immediately adjacent to the creek; no artifact concentrations were found, however.

Access to the south side of the Narrows on the Swan River delta was achieved with some difficulty by driving as far north as possible along an existing road, then following a section-line to within walking distance of the shore. The land grades gently to the lake, and there are numerous clumps of willows along the shore. A single site (GiPu-3) was found in the water. A few pre-contact artifacts were found by wading in the shallows (e.g., cobble spalls and quartzite core fragments); there was also some contact period material (a 1911, Canadian 10 cent coin and a 1900 U.S. quarter; a sherd of blue transfer print earthernware; a padlock; and a sherd from a glass cup). There was also recent garbage on the bank just above the finds. Obviously, the high lake levels in the 1970s and early 1980s had inundated the site area and had gradually stripped away the overburden leaving the mixture of historic and pre-contact artifacts on the clay lake bottom.

The other area examined along the south shore of Lesser Slave Lake was from the town of Assineau to the Sawridge Indian Reserve, west of the town of Slave Lake (Figure 18). Three sites were found during this traverse, the most promising of which were two (GiPs-3, 4) in the Canyon Creek Campground area, located east of the town of the same name. A small collection included surface material and artifacts from a test pit, the latter indicating undisturbed cultural deposits at GiPs-3. This site is situated on a high ridge, about 20 m above lake level, but immediately adjacent to the shore, where the railway bed is located; the site is at least 100 m long. The second site is located just east of the campground on the same ridge or terrace overlooking the lake. A small collection (seven pieces) included two flakes and an end scraper, all of which are made of quartzite.

The last site in this area of the lake was found on a bulldozed exposure along the north side of the secondary road just east of Wagner. Three quartzite flakes were collected from the exposure, which is likely situated along the same high terrace as the other Canyon Creek Campground sites.

East Shore

Only a few localities were visited along the east shore of the lake (Figure 19 and Figure 20). In part, this occurred because of some previous work in the area in the form of historical resources impact assessments in connection with construction along the Slave River (French 1979) and Lesser Slave Lake Provincial Park (Fedirchuk 1981).

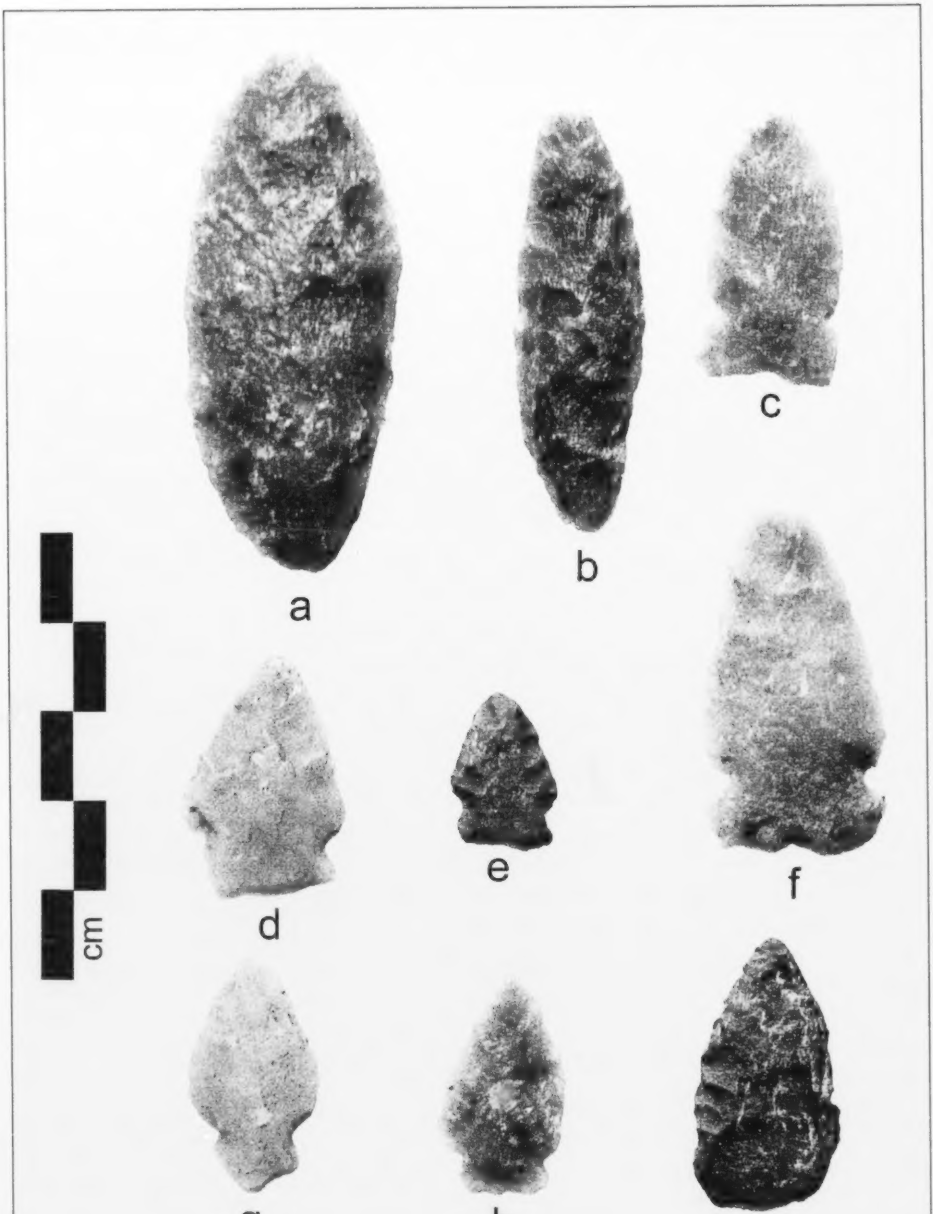

a
b
c
d
e
f
g
h
i
cm

Figure 17: Projectile Points from the Madsen Site (GhPv–1)

A few flakes were found scattered on top of Martin Mountain, but the site (GiPq-15) had been completely destroyed during levelling operations connected with construction of a fire observation tower many years ago. One site (GiPq-5), marked by a surface scatter of quartzite debitage (n=14), was found in a Provincial picnic area by the lakeshore, but it was also disturbed by construction activity.

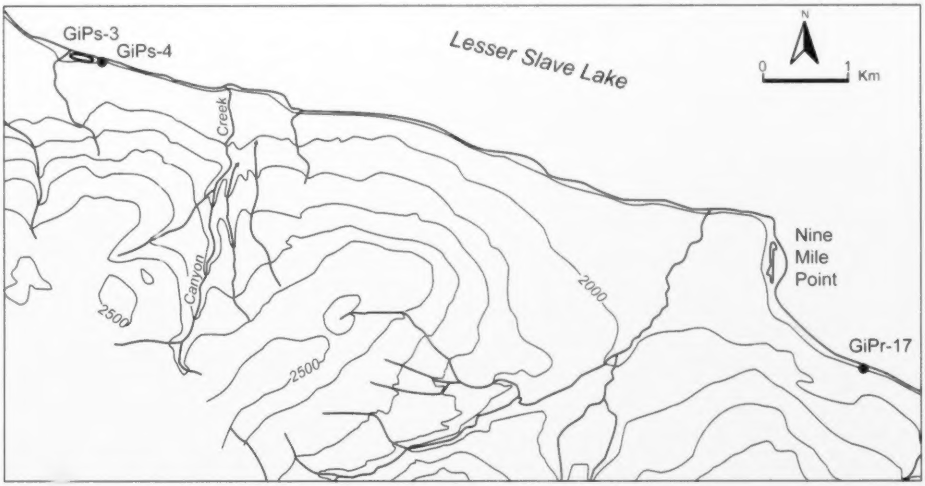


Figure 18: Sites in the Canyon Creek Area

Miscellaneous

A few sites were located in areas peripheral to the main study region. These include destroyed sites at Gift (GlPw-1) and Utikumasis (GlPv-1) lakes (Figure 1) with 49 and two specimens, respectively. These lakes are located approximately 80 km north of the west end of Lesser Slave Lake (Appendix A).

Closer to Grouard Mission were two sites found with the help of local farmers. These include GkQb-1, where an ovoid chert biface was found during cultivation of a field. The field was examined, but despite being in summer-fallow, there was no additional cultural material. A second site, GjQa-8, located east of the previous one, had two lanceolate bifaces (Figure 21). The specimen on the left of the figure was found in clay about 40 cm below surface during construction of a barn in the late 1930s. The second point was found in a small gravel pit in the next quarter section to the south of the main farm; we did not visit this location. The landowners also had a few artifacts from their garden, which was not far from the barn. These included a core fragment and a brown chert side-notched point, which was split longitudinally from the tip to the base. None of the artifacts was measured as the owner was reluctant to loan them for study.

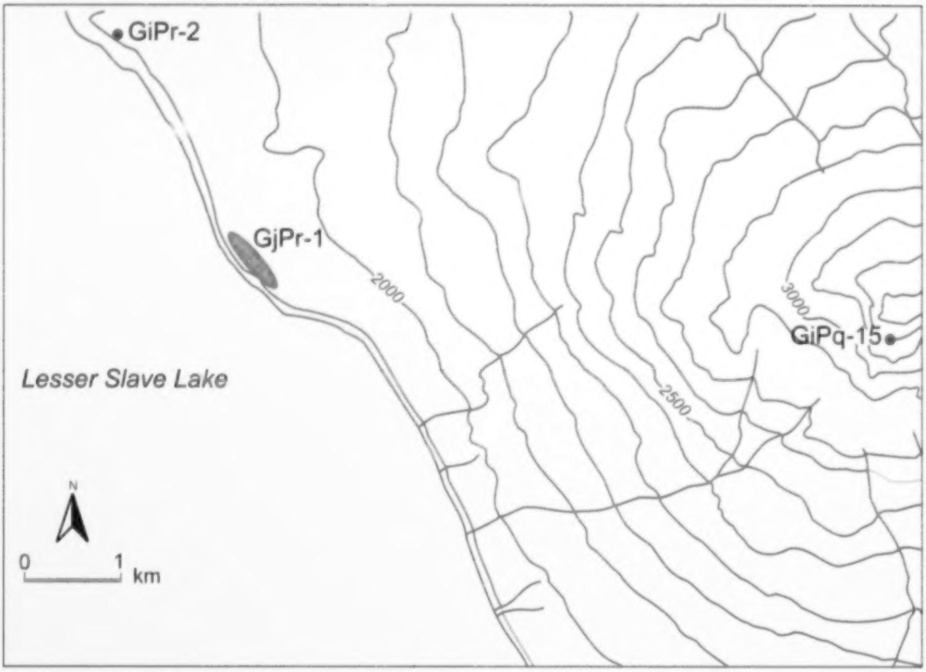


Figure 19: Northeast Shore Sites

Summary

In all there were 79 new sites discovered in the study area. Most sites were situated in the northwest sector of Lesser Slave Lake (n=27), particularly on and near Shaw Point, and around Buffalo Bay and South Heart River (n=27). The former group of sites occurs mainly on the first lake terrace, or in a few cases on higher terraces (e.g., GiQa-4 to GiQa-8). More intensive survey in this area along ancient strandlines, would undoubtedly increase this number considerably. This possibility is suggested firstly by the density of sites found east of Shaw Point (Figure 3) and secondly by the results of reconnaissance in the Buffalo Bay-South Heart River area. Here, agricultural activity provided better conditions for site discovery, revealing many sites on ancient terraces, likely relating to higher stages of Lesser Slave Lake.

There appears to be a substantial difference in the frequency of sites between the eastern portion of the study area (east of the Narrows) and the western sector. Only seven new sites were recorded in the former area, versus 72 in the latter. Even with the addition of previously recorded sites (n=12) in the eastern zone, the trend is the same. The difference could reflect less intensive survey effort in the eastern zone, or the greater difficulty of site discovery because of the dense bush, as compared to Shaw Point and the cultivated areas around Buffalo Bay in the west. However, previous

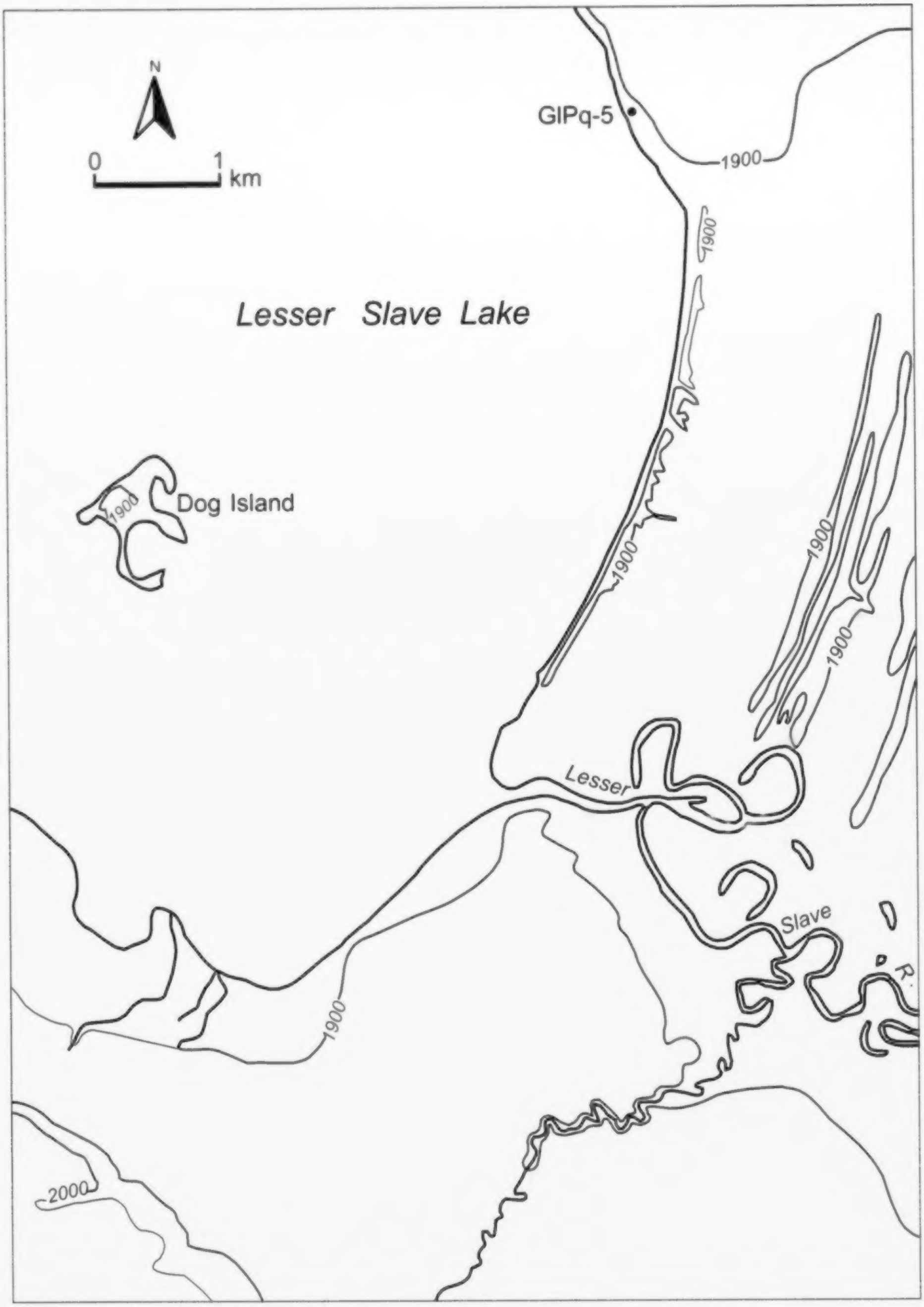

N
0
1
km
GlPq-5
1900
Lesser Slave Lake
Dog Island
1900
Lesser
Slave
R.
2000

Figure 20: East Shore Sites

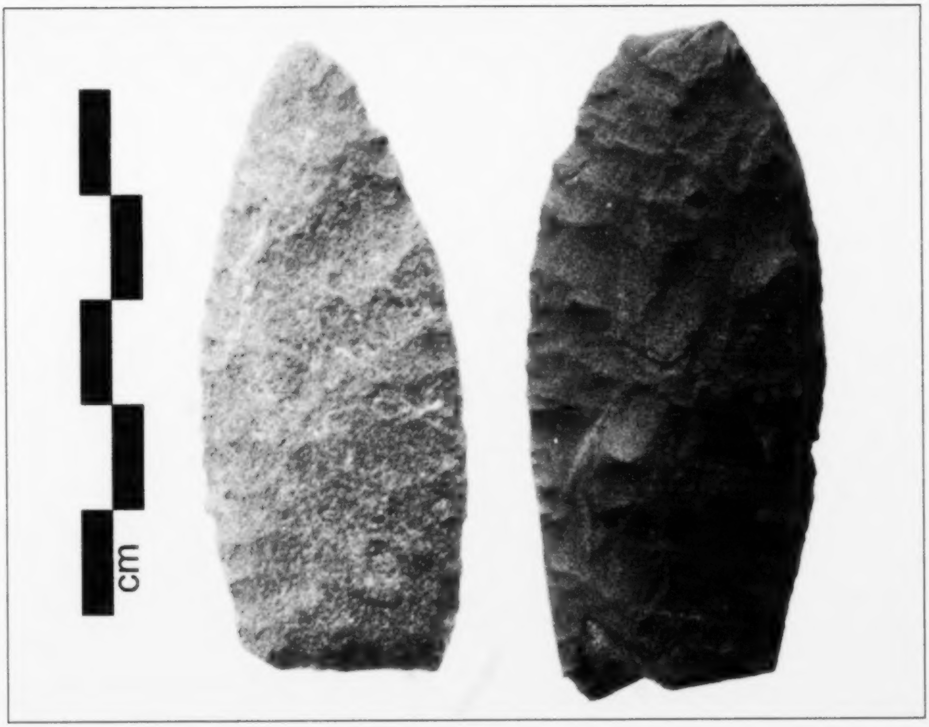


Figure 21: Lanceolate Points from the Zuehlke Site (GjQa-8)

surveys along the east side of the lake had similar low success rates, suggesting that the difference in site frequencies may reflect the relative productivity of the environment between the two areas. As indicated in Chapter 1, historical and modern biophysical information show that the western zone has a better resource base than the east. The juxtaposition of boreal forest north and south of the lake, with moose, deer, and small and medium-sized animals; the parkland isolate to the immediate west, with a significant bison resource, that was likely created and maintained by aboriginal forest burning practices; and the fishery and waterfowl populations on the lake itself, likely contributed to the enhanced potential of the western sector to human habitation. How far back in time this difference can be extended is unknown, but I suspect it may be at least several thousand years.

Finally, some general observations can be made regarding the range of artifacts that were found. Firstly, there are indications of possible Palaeoindian (12,000-8,000 BP) occupation in the study area. Tentatively, this is indicated by lanceolate specimens from GjQa-8, which is located about 18 kilometres north of Lesser Slave Lake. However, some caution is is needed here because lanceolate points with similarities to very early types are a characteristic of the Early Taltheilei Tradition in the Northwest Territories and therefore considerably later in time (c. 200 B.C-A.D. 500). More convincing evidence of Palaeoindian occupation is suggested by artifacts from a site located somewhat outside of the research area. This includes two macroblades from the Burley Site (GiQf-4), located about 30 km west of High Prairie (Le Blanc and Wright 1990). The site is situated on the north edge of the Iroquois Lakes spillway, a drainage channel "...associated with the last two major stages [Clayhurst and Indian Creek, Mathews, 1980] of the ice-dammed Glacial Lake Peace" (Le Blanc and Wright 1990:4-5). The channel "...would have been active from roughly 12,000 to 10,000 years ago..." (Le Blanc and Wright 1990:4-5). Large blades such as the Burley specimens have been found mainly in the Peace River country of Alberta. However, Wilson mentions the recovery of "several modified macroblades" from the Pink Mountains site in northeastern British Columbia (Wilson 1987:217, 1989) and illustrates one example in a later report on the site (Wilson 1996: Figure 4b); there are no detailed descriptions, however.

The Peace River macroblades were thought to relate to the earliest part of the Early Prehistoric period (Le Blanc and Wright 1990) on the basis of their similarity to Clovis blades from the High Plains (Green 1963). Collins (1999) has provided a comprehensive review of Clovis blade technology in North America, and although he does not refer to the Peace River specimens, there are distinct similarities between the latter, and examples in collections from the western United States, perhaps suggesting some type of technological and possibly an historical relationship.

In addition to the blades from the Burley site, there are three finely made, oblique, ripple-flaked lanceolate specimens (Figure 22) likely belonging to the Plano Series of the Early Prehistoric Period (Vickers 1986:36-41). These bifaces were found in the southwest portion of the quarter-section, approximately 200 m east of the macroblade finds. None of them is complete, but the largest could fall into the range of an Eden point, though the slightly convex lateral margins could also suggest Agate Basin.

Later time periods are represented by evidence of an Early and Late Taltheilei Tradition, possibly suggesting northern influence where Taltheilei is well represented in the Districts of Mackenzie and Keewatin in the Northwest Territories. Middle Prehistoric Period plains influence is tentatively suggested by a possible Oxbow point identified by a earlier investigator at a site (GjQc-1, reported on archaeological site form) west of Buffalo Bay. A possible Besant point from the Madsen site could imply Late Prehistoric occupation, a suggestion which may receive additional support from a second possible Besant example from the Hidden Creek site (see Chapter 4). Late Prehistoric occupation is also evident in projectile points (Plains Side-Notched) from a number of other sites (e.g., GiQa-3, see Chapter 3; GhPv-1). However, ceramics, which in many areas in western Canada are synonymous with the Late Prehistoric Period, were absent in all of the sites discovered during the course of this project; moreover, none of this material was found during any of the previous investigations. I will return to this aspect in Chapter 5.

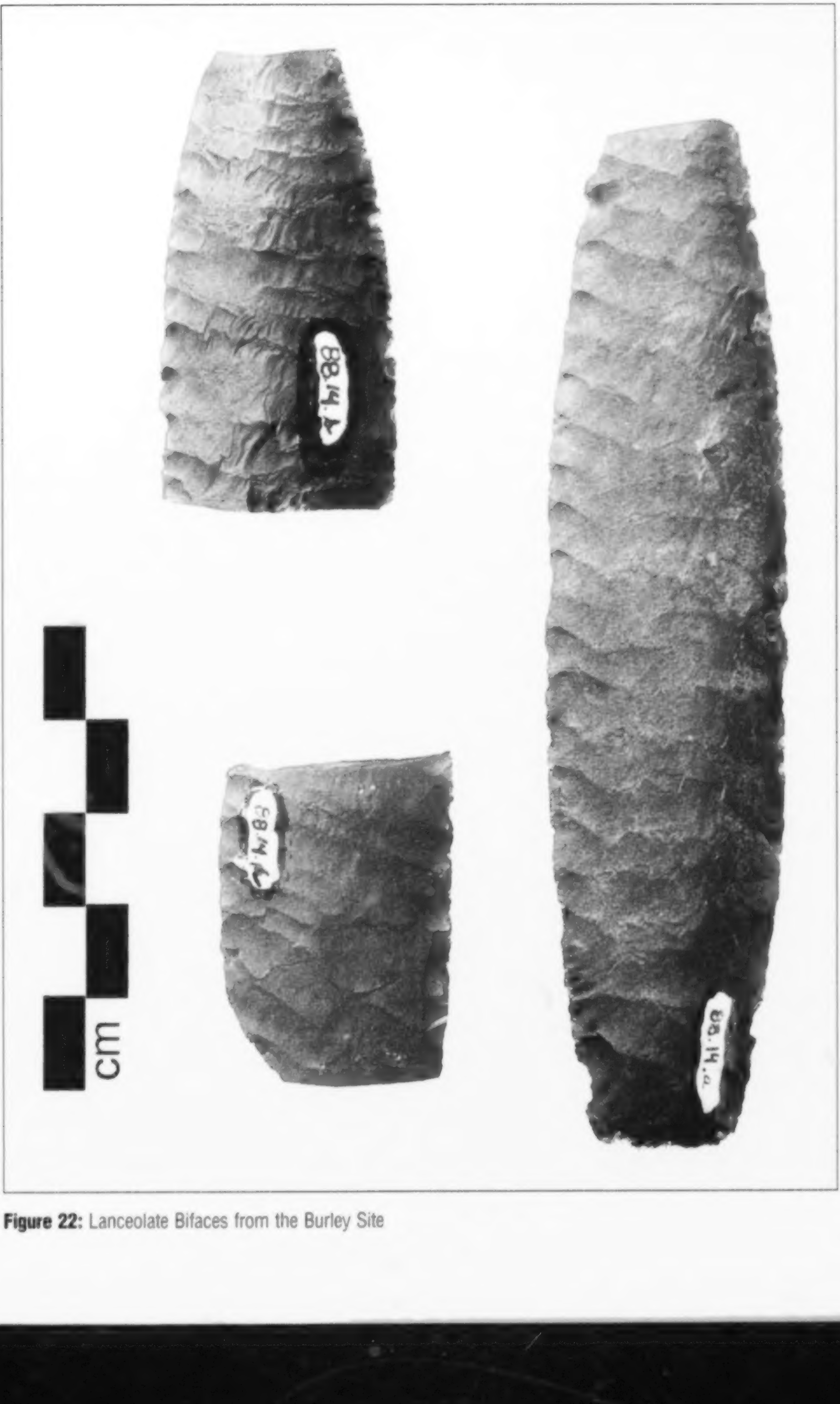


Figure 22: Lanceolate Bifaces from the Burley Site

Indications of extra-regional contact are suggested by: (1) the jadeite adze and steatite pipe from the Madsen site (GhPv-1), the former likely originating in British Columbia, the latter possibly from southwestern Alberta; (2) the presence of Tertiary Hills Tufaceous Clinker from two sites (GjQa-3, GhPv-1), whose source lies approximately 1400 km to the north near Fort Norman, Northwest Territories; and (3) obsidian artifacts from GiQa-3 and GjQc-14, where specimens from the former site indicate a source near Anahim in west-central British Columbia (Bailey n.d.).

In sum, typological evidence and the presence of items and raw materials that are clearly exotic, show that the Lesser Slave Lake region experienced influences from a vast area of northwest North America. This includes the lower Mackenzie River (THTC) and the region east of the river and north of 60° N latitude (Taltheilei Tradition), interior British Columbia (obsidian, and jadeite adze), and the Plains-Parkland areas of the prairie provinces (steatite pipe and various projectile point styles).

CHAPTER 3

The Slump Site

The Slump site (GiQa-3) is located on the northwestern shore of Lesser Slave Lake in Hilliard's Bay Provincial Park, about 19 km southeast of the town of Grouard Mission (Le Blanc 1980). Situated a rather subdued headland between Shaw Bay (local name) on the west and Hilliard's Bay on the east, the site lies on a terrace about 4.5 m above the modern cobble-covered beach (Figure 23). The terrace is truncated on the east by a 20 m wide slump block which is responsible for destroying part of the eastern side of the site. The slumping appears to have occurred as a result of local failure of unconsolidated sediments, caused by water seeping along the contact between the sediments and underlying sedimentary bedrock, which outcrops on the beach in front of the site (C. Schweger pers. comm., June 1988). There is currently an active seep on the beach, just a few metres from the edge of the slump block, and slumping may have happened during a period of abnormally high rainfall when the contact zone became saturated. It should be noted that we observed several seeps and indications of other slumps in areas to the east of the Slump site. Undoubtedly, other sites in the area have been disturbed by the active movement of sections of the terrace systems in this area of the lake.

To the west of the site, the terrace drops off to a lower bench that is about 3 m above the beach. This lower terrace is composed of rounded pebbles and cobbles capped by a thin (5–10 cm) accumulation of aeolian sediment. Extending north from the eroding, near vertical exposure face, the terrace forms a flat lower bench that continues for about 3 m, then gradually slopes up approximately 2 m to a larger upper bench. This higher bench continues a further 100 m to the foot of another terrace that turns northward away from the modern lake-shore (Figure 24).

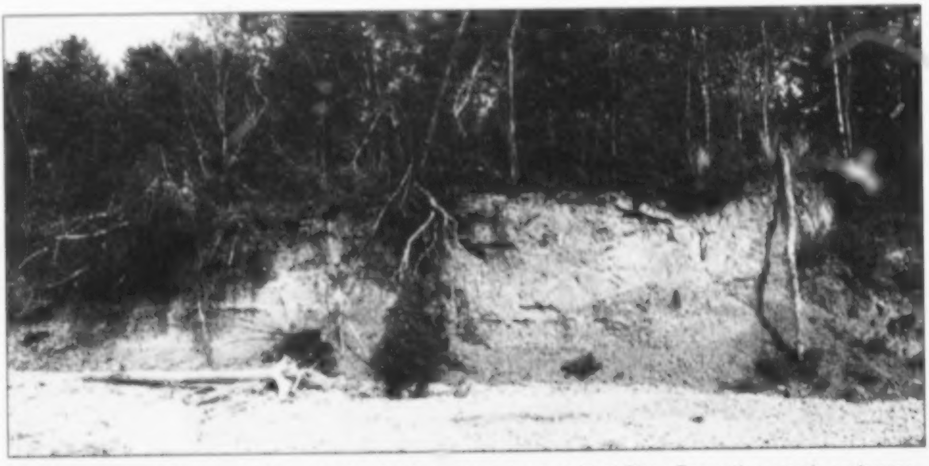


Figure 23: View of Slump site from the Beach. Slump block is on right of Plate; Excavation area is on terrace above the bank

Testing in 1982 indicated that the site extended around the slump block to the east and continued in this direction for an undetermined distance. Testing also indicated a distribution of cultural material as far back as 20 m from the erosion face on the lower bench, to a section of the historic Grouard Trail, which was constructed in 1895 to connect the towns of Slave Lake and Grouard; the trail is indicated on a 1919 survey map of the region (National Map Collection 5/503/1919)[6]. Two other limited testing programmes that were carried out in connection with the field school subsequently confirmed the horizontal extent but also indicated that cultural material was present up to 100 m north of the terrace edge.

The vertical erosion face on the south side of the terrace was subject to severe wave erosion during periods of high water in the late 1970s and early 1980s, and it is probable that a significant portion of the site may have disappeared as a result. These fluctuations seem to be the norm, so periodic undercutting of the bank can be expected in the long-term.

History of Work

When the site was discovered early in the 1980 field season, its existence was indicated by several quartzite artifacts (spalls, cores and flakes) at the base of the erosion face and on the surface of the slump block; there were also a few pieces of fire-cracked rock scattered over the surface of the slump. The latter was almost devoid of the dense aspen bush that covers the main site area on top of the terrace. Three shovel tests on the lower bench of the terrace produced a considerable abundance of fire-cracked rock, faunal material and quartzite flakes. A test trench (8 m x 1 m) was laid out parallel to the exposure face on the lower bench using an arbitrary datum established on the east end of the terrace near the edge of the slump block.

Because the 1980 datum on the lower bench could not be relocated during the field school excavations, a second one was established at the edge of the terrace on the upper bench. Baselines were oriented with respect to true north, with the east-west baseline extending more-or-less along the terrace edge; the north-south one is situated on the western third of the site.

In all, 91.5 m^2 were excavated: ten, 1 x 1 m units in 1980, plus a, 1 x 0.5 m square, and 81, 1 x 1 m units during the archaeological field school from 1988 to 1990. The 1980 test was carried out on the lower bench. During the 1988-1990 work, three units were excavated on the lower bench, the rest on the upper bench.

Trowels were used for digging in all years, and all matrix was sieved, using 6.2 mm (1/4") mesh screens during the field school. Three dimensional piece plotting was carried out for all artifacts and faunal material. Horizontal measurements were made with respect to the west and south walls, and vertical control was maintained using strings and line levels with reference to an arbitrary point established on a large tree on the site.

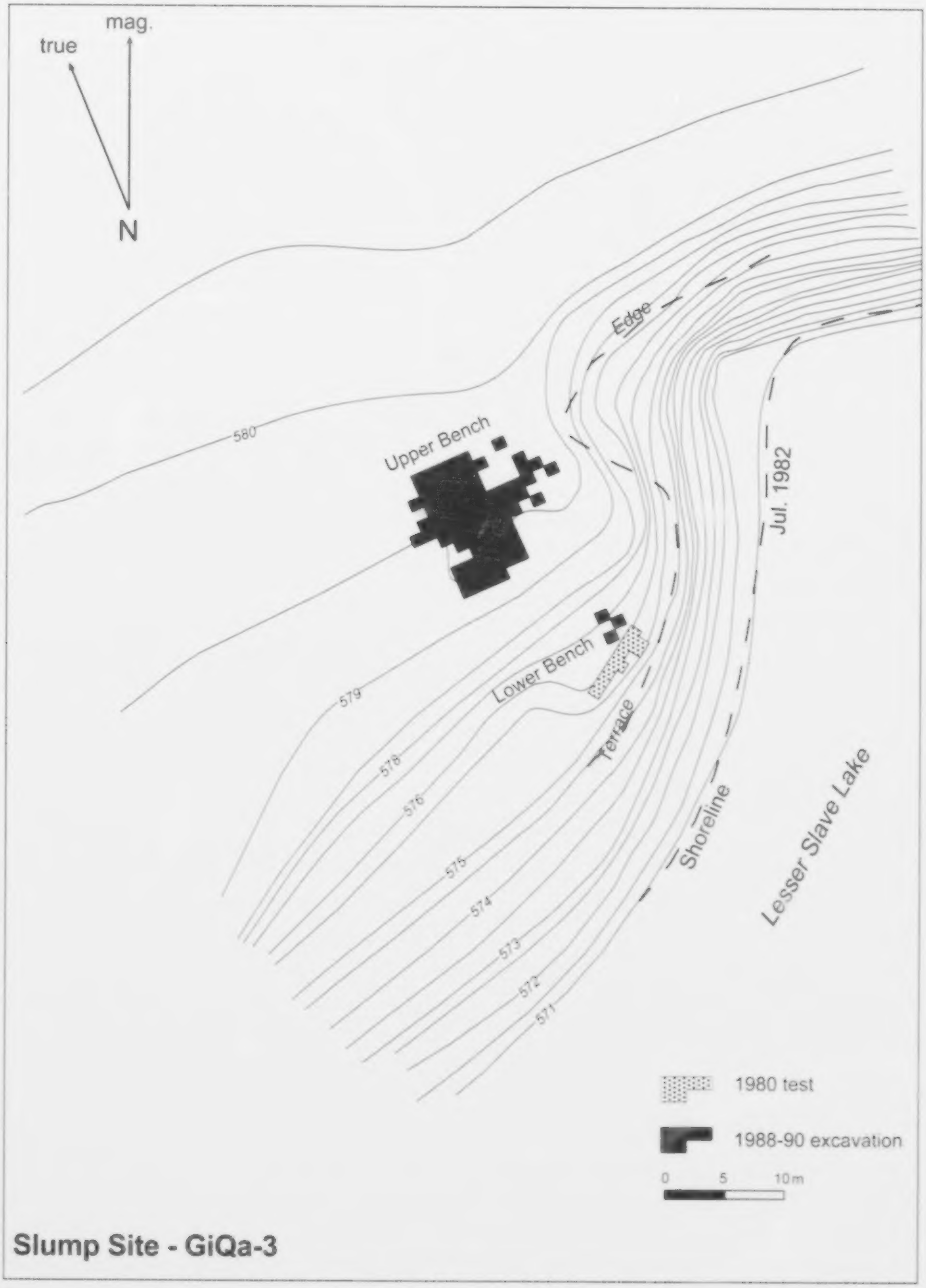

mag.
true
N
580
579
578
576
575
574
573
572
571
Upper Bench
Lower Bench
Edge
Terrace
Jul. 1982
Shoreline
Lesser Slave Lake
1980 test
1988-90 excavation
0
5
10 m
Slump Site - GiQa-3

Figure 24: Map of the Slump Site

Stratigraphy

Excavation followed the natural stratigraphy (Figures 25-26). The levels consist of the Ah (level 1), the Ae (level 2), and the B (level 3) horizons. The leaf litter of level 1 varied from 3 to 15 cm thick. The second level consists of a dark brown to black loamy soil, 2.5 to 15 cm thick. Level 3 is light yellow-brown in colour and is of unknown thickness. It varies from silty clay in the upper 10-15 cm to a more compact clay in the deeper portions of the excavations. As indicated by the range in thickness of levels 1 and 2, the contact between levels is characterized by an undulating, "peak and valley" type of microtopography. Consequently, there is considerable dispersion of artifacts throughout the profile, with little clustering within levels. Thus, depths below datum for artifacts within level 2, for example, often overlap those for level 3, even when measured on a flat plane such as that on the upper bench. This situation was also observed in 1980 and was attributed to the fact that there is considerable vertical movement of artifacts over 10-20 cm. In boreal forest sites such as GiQa-3, this displacement could be caused by factors such as freeze-thaw cycles (Bowers et al., 1983); root action, including displacement by live roots or in root casts (Wood and Johnson 1978); tree throws and faunalturbation (ibid.); or trampling during period of

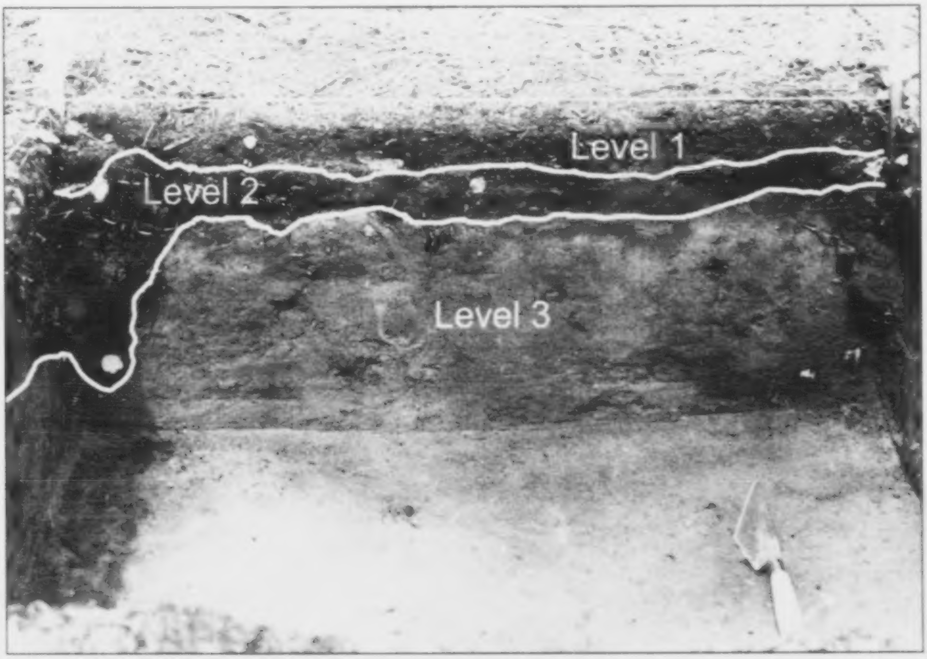


Figure 25: Typical Profile at the Slump Site (Upper Bench, North Wall of N3E6)

occupation (e.g., Villa 1982; Villa and Courtin 1983). Tree throws were evident in several locations on and around the Slump site, and some of these had uprooted a cubic metre or more of sediment (Bugera n.d.). The results of such an event would not be too difficult to visualize: more-or-less horizontal levels would be tilted vertically, then would eventually erode, redepositing artifacts, perhaps even forming clusters of artifacts that were not associated in any systemic context (Schiffer 1987).

In short, without the aid of typological separation or situations in which there is a high degree of vertical segregation between levels, i.e., levels sealed by sterile deposits of sediment, it is difficult to isolate individual components in sites such as GiQa-3. However, refitting studies have proven to be an effective technique for identifying different components (cf., Cziesla et al. 1990) and this was applied with some success to the Slump site (see page 47).

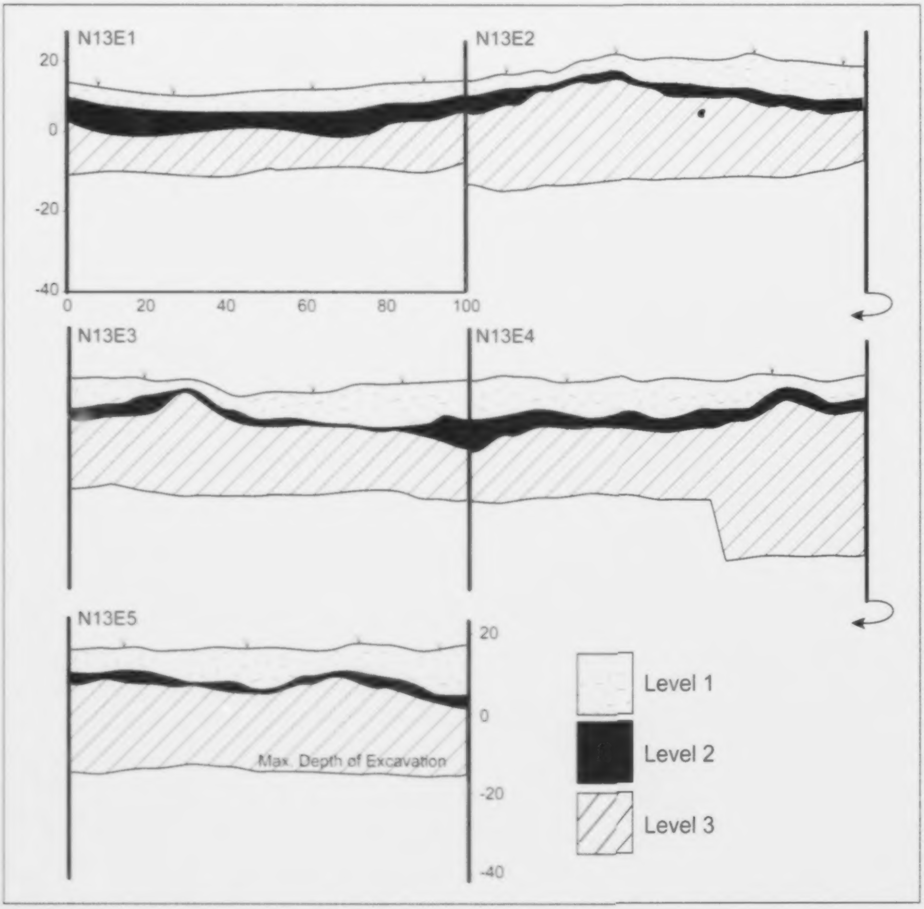


Figure 26: Composite East–West Profile Across the North end of the Excavation

Features

Although a fairly substantial area was excavated at the Slump site, few features were observed.

Hearths

A hearth was found in level 2, just above level 3 (in units N10E1-E2 and N11E1-E2). Small pockets of ash were also found in N10E3 that probably relate to the feature. Disturbance by tree roots, particularly in N11E1, which has a large aspen standing just to the northwest, made it difficult to discern the limits of the hearth.

The feature was indicated by black-grey ash that reached a maximum thickness of 8 cm in the centre of N11E1, but thinned rapidly from this point. The ash had a greasy feel and contained burnt and unburned fish bone; there was also fragmented fish and mammal bone around the periphery of the ash deposit, particularly in N11E1. The level 3 sediment under the ash was burned an orange-like colour.

Fire-cracked Rock Concentrations

A cluster of fire-cracked rock was found in 1980 in level 2 that was mixed with quartzite debitage (Le Blanc 1981). The feature occupied most of a 1x1 m unit, and although not completely exposed, it appears to been been a midden feature (Figure 27)

Four dense concentrations of fire-burned rock were recorded in level 3. Each contained pebbles and cobbles that exhibited distinct points of percussion indicating intentional fracture either before or after being subjected to heat. For lack of a better term, these rocks are referred to as modified fire-broken rock (MFBR, see page 72). The first of these features was located in the southeast quadrant N7E6 and comprised 31 pieces of rock (Figure 27); there was no indication of a hearth in the vicinity of the feature. The second cluster of 19 specimens was located in the northwest quadrant of N9E4; it too lacked any evidence of hearth material. The third cluster (27 pieces) was found in the southwest quadrant of N7E9. By far the largest concentration covered much of N10E3 and included 145 pieces of MFBR. However, there were more diffuse clusters that may have been related to this feature immediately to the north and northwest of N10E3. As with the other clusters, there was no evidence of an association with a hearth in the same level. There may have been some relation of the concentration in N10E3 with the hearth described above, if the discrepancy in the levels can be attributed to serious root disturbance. Alternatively, these rock concentrations may represent deposits of debris removed from primary context: e.g., the tight clusters in N7E6 and N9E4 suggest an intentional disposal of rock that had been used elsewhere.

Pits

A pit was also found in unit S1-2W2 and S1-2W4 (Le Blanc 1981). It was initially indicated by a fairly large organic stain in the otherwise undifferentiated level 3 sediment, at approximately 25 cm below surface, and a by dense concentration of rather small, modified fire-broken rock, beginning at 35 cm below surface (Figure 30).

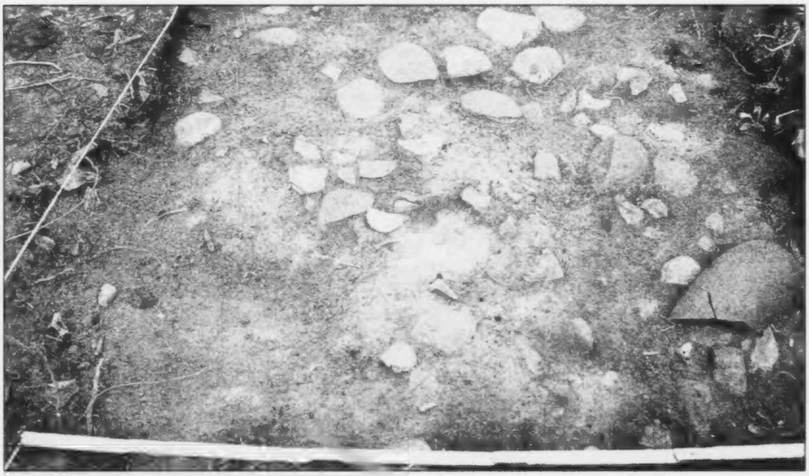


Figure 27: Fire–cracked Rock Cluster in S1W4, Lower Bench

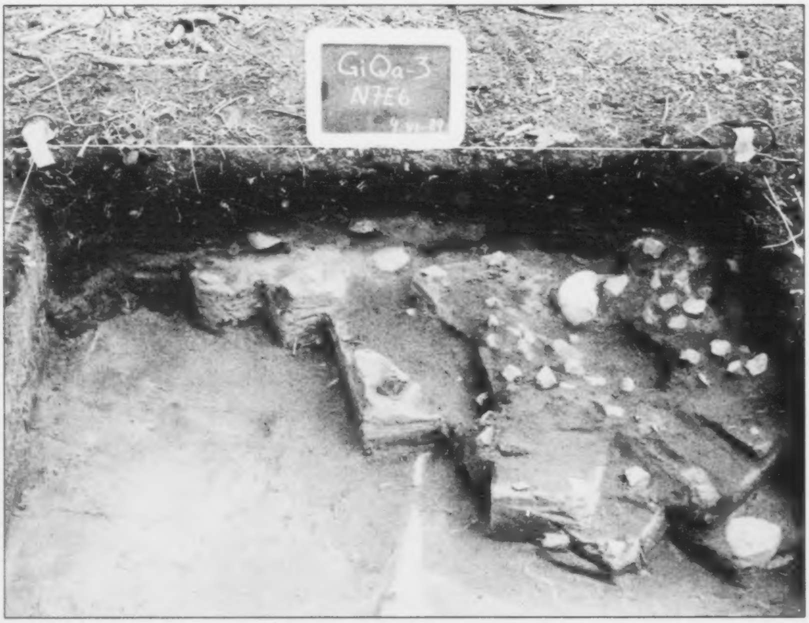


Figure 28: Modified Fire-broken Rock Concentration

The stain measured nearly a metre on its long axis before it disappeared into an unexcavated unit on its southern margin. The cluster of MFBR was about 40 cm long and had a roughly bilobed shape; pieces of the rock continued to a maximum depth of 45 cm below surface. All of the 149 pieces of rock in the cluster were intentionally broken. The rocks have an average weight of 24.1 g (s. dev.: 13.6) and appear to have been produced from pebbles approximately 50-60 mm in diameter. The function of the pit is not immediately obvious. There were no indications of actual fire in the pit; i.e., ash or charcoal. However, it is conceivable that the rock was heated elsewhere and used in the pit for roasting. Alternatively, the rock may have been used elsewhere, then dumped in a natural hollow, perhaps a tree-throw.

Similar intentionally broken and heated rocks were common (n=714) in the area excavated in the 1988-90 period, and other concentrations were found, but not in pits (Figure 29). Artifacts found among the rock included a few flakes, a core, and some tooth enamel fragments.

An attempt was made to replicate the creation of MFBR by two field school students, by heating water using (1) unmodified cobbles, (2) pebbles and cobbles that were broken first then heated, and (3) pebbles that were heated first then broken (Craig and Mutch n.d.; Deck and Martin n.d.). Although not exhaustive, they found that pebbles that were heated first then broken resembled more closely the MFBR found on-site.

As to heating efficiency, I had hypothesized that breaking the rock into smaller pieces would have made the process of boiling more rapid by increasing the surface area of heated rock that would be in contact with water. The student experimenters, however, found that the unmodified cobbles were more efficient at heating water than the broken pebbles. As the experiment dealt only with boiling water, the small-sized MFBR may have been produced for a different heating requirement.

A second possible pit was found along the west side of N9E8 in the southwest quadrant. It consisted of a small (30 cm in diameter) organic stain containing bits of charcoal, a few pieces of bone, and small pieces of fire-cracked rock. There is a distinct possibility that the feature was an accumulation of debris in a natural depression.

Miscellaneous

A short alignment of three flat cobbles was found in level 2 in the north half of S6E10. The rocks ranged from 10-15 cm in diameter. The unit north of S6E10 was probed with a surveying pin, but no further rocks were found.

Two post remnants, both still retaining bark, were found in N4E1. They began to appear in level 1 and continued well into level 3. One was smaller than the other and appeared to have been used to wedge the larger one into the hole. The deteriorated condition of the posts suggest that they were fairly recent, probably associated with a camp within the last 50 years or so.

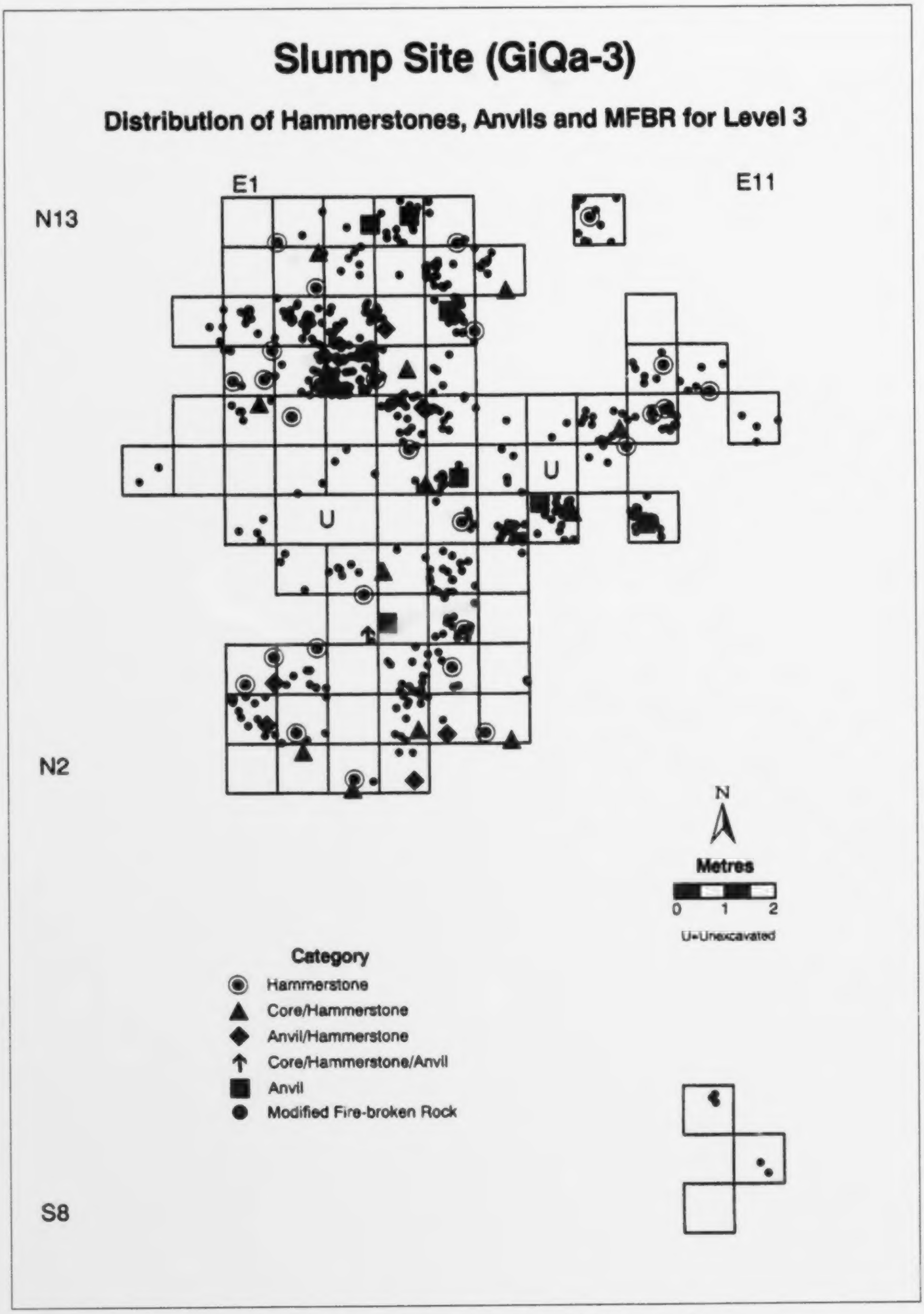

Slump Site (GiQa-3)
Distribution of Hammerstones, Anvils and MFBR for Level 3
E1
E11
N13
N2
S8
U
U
N
Metres
0
1
2
U=Unexcavated
Category
Hammerstone
Core/Hammerstone
Anvil/Hammerstone
Core/Hammerstone/Anvil
Anvil
Modified Fire-broken Rock

Figure 29: Modified Fire Broken Rock Distribution for Level 3 for 1988–90 Excavations

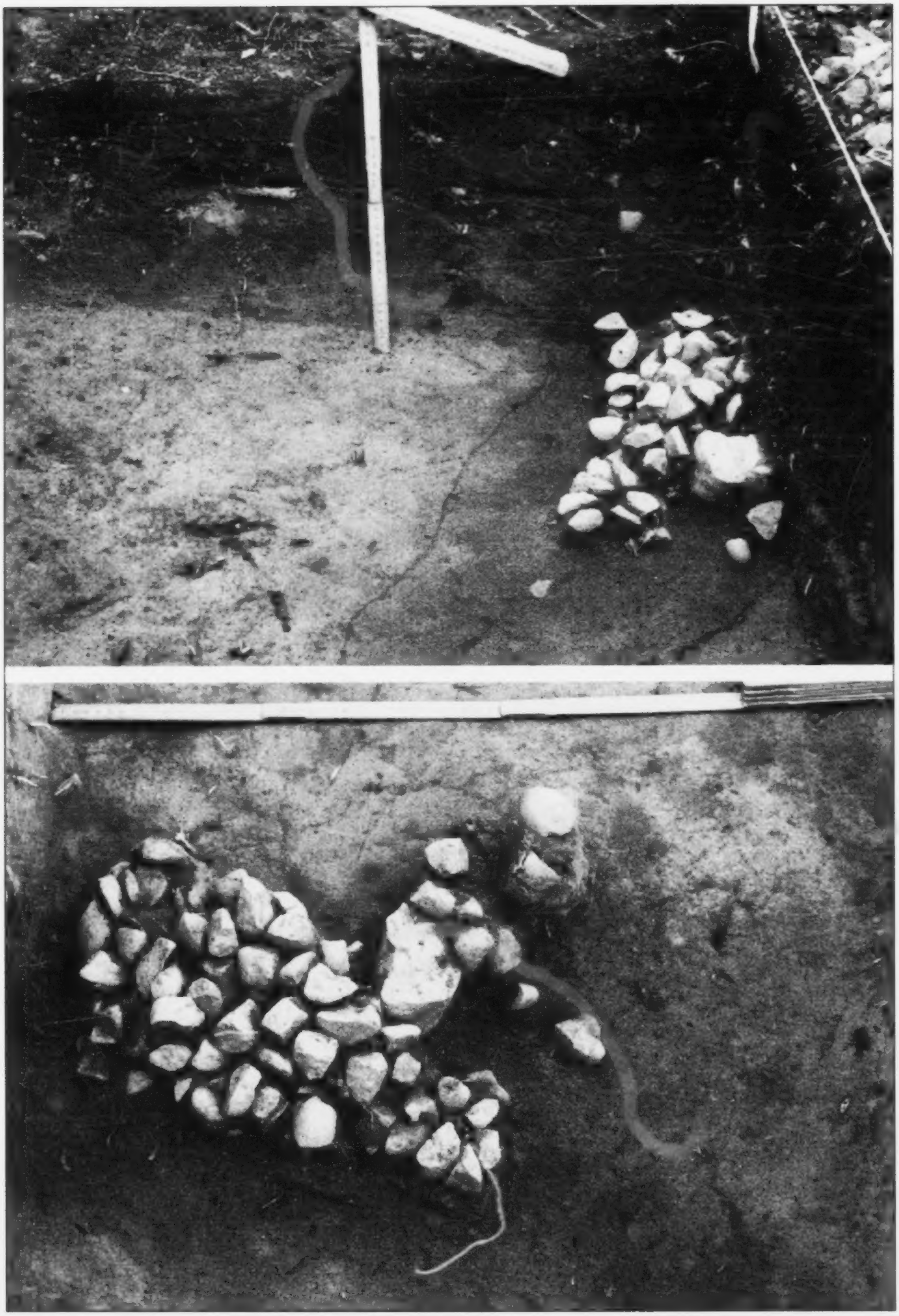


Figure 30: Modified Fire-cracked Rock Concentration in a Pit

Refitting Study

A pilot refitting study was conducted on the 1988-90 assemblage. A portion of this was completed on part of the collection as student projects (McCammon and Norsworthy n.d.; Townsend n.d.), and a more intensive effort was completed in the lab in Edmonton, when all artifacts could be laid out for inspection.

Refitting has been widely used as a means of reconstructing technological procedures, including the "life-histories" of tools (e.g., manufacture, use, recycling); analysis of the discreteness of archaeological levels; and doing spatial analysis. Considerable success has been achieved in all three categories, although the technique requires a large time investment. This may account in part for its relative lack of popularity in North America as opposed to Europe (Cziesla 1990 and Cziesla et al. 1990 for a review and compendium of European approaches).

At the Slump site, the major rationale for employing the approach was to examine the integrity of the natural stratigraphic levels that governed the excavation. Specifically, I wanted to assess the degree of separation between levels 2 and 3. As noted elsewhere, the two levels are in contact. Level 2 is quite thin, and the interface between them is characterized by quite a bit of irregularity, caused by a variety of bioturbation factors.

Figure 31 presents a plan view of the refits. Not included on this diagram are mends of naturally spalled (most likely due to frost) artifacts, which were usually tightly clustered at the location where the fracturing occurred (i.e., within 5-10 cm). A vertical view of refits could not be constructed because of some unresolved discrepancies in depth below datum measurements. Table 2 presents a summary of level and inter-level refits by the type of refit; i.e, a production sequence in which successive flakes are re-attached in sequence of detachment, or flakes fitted to a core, or breaks. The latter are considered to be breaks or snaps that occurred during various reduction procedures (e.g., a flake that breaks longitudinally through the platform, or snaps distally), or possibly some other type of post-depositional disturbance. Also included are summary figures on the distance between refitted specimens Figure 32 presents a graphic representation of grouped lengths of refit lines following Cziesla (1990), and Figure 33 displays the groupings somewhat differently.

In keeping with the respective size of the overall artifact samples, most of the refits are from level 3, and of those, more than half are breaks rather than production sequences. As the refit length graphs indicate, the overwhelming majority of both types fall into the short to medium categories (1 = ≤ 0.5 m, short; 2= 0.5–2.1 m, medium; 3= 2.1–4.0 m, long; 4 > 4 m, very long). According to Cziesla, this pattern suggests largely flake production strategies, and rather short-term occupation. One would expect much longer distances between refits for longer occupations because of displacement due to indirect movement caused by trampling and scuffing, or intentional movement as a by-product of redepo sition associated with refuse disposal. Also, tool modification and use typically results in longer refit lengths.

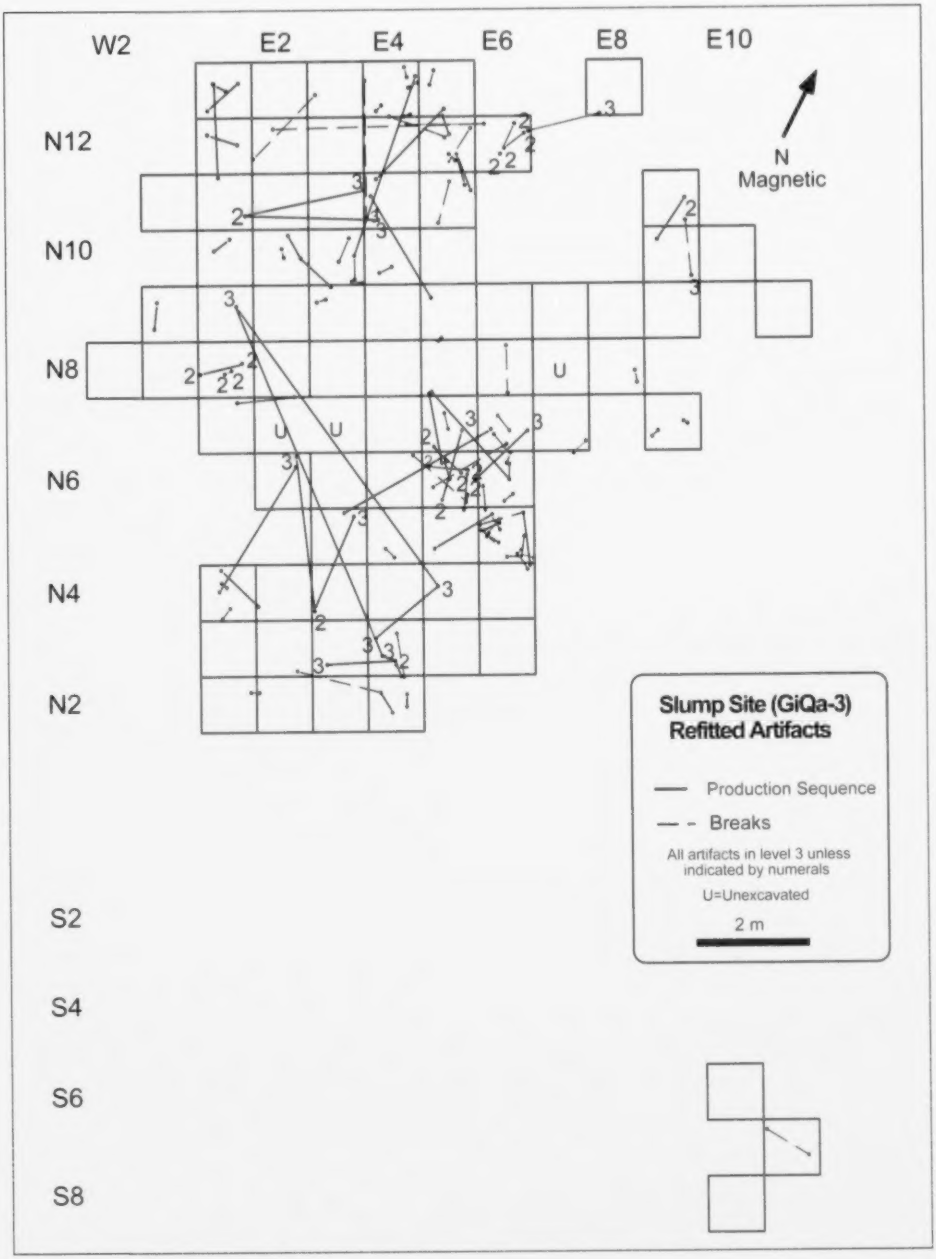

W2
E2
E4
E6
E8
E10
N
Magnetic
N12
N10
N8
N6
N4
N2
S2
S4
S6
S8
U
Slump Site (GiQa-3)
Refitted Artifacts
Production Sequence
Breaks
All artifacts in level 3 unless indicated by numerals
U=Unexcavated
2 m

Figure 31: Map of Refitted Artifacts

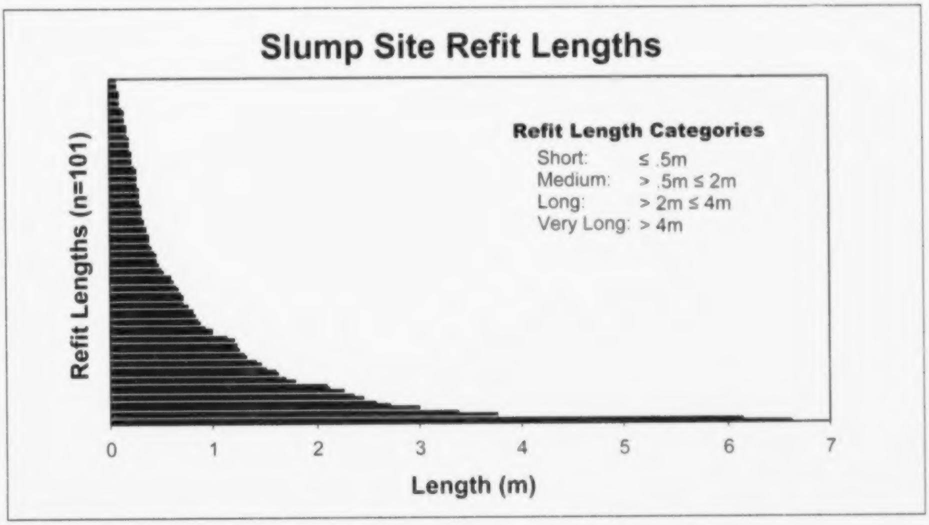


Figure 32: Display of Distances between Refitted Artifacts

Table 2: Level and Inter-level Refits

		Levels			
Type	**Distance (cm)**	**2**	**2/3**	**3**	**Totals**
Break	N	4	1	48	53
	Min.	44.0		8.0	8.0
	Max.	68.0		375.0	375.0
	Mean	59.0	100.0	54.6	55.8
	S. dev.	10.5		68.2	65.2
Production Sequence	N		12	36	48
	Min.		10.0	8.0	8.0
	Max.		273.0	663.0	663.0
	Mean		128.1	118.9	121.2
	S. dev.		85.0	154.0	139.2
Totals	N	4	13	84	101
	Min.	44.0	10.0	8.0	8.0
	Max.	68.0	273.0	663.0	663.0
	Mean	59.0	125.9	82.2	86.9
	S. dev.	10.5	81.5	116.9	111.3

There are several inter-level refits, nearly all of which are production sequences; these require some discussion. Firstly, there is no simple explanation for these inter-level refits; i.e., there is no concentration of these level 2/3 conjoined artifacts that would suggest some localized disturbance, nor is it possible to attribute the inter-level refits to some unit-specific recording error. All of these cross-level mends occur in several areas of the site and between units dug by different excavators in each of several field seasons. I believe that levels 2 and 3 represent at least two separate occupations. The crossfits may therefore be due to vertical displacement through the deposits, probably because of one, or more likely a combination of various types of disturbance factors (bio- or cryoturbation). There may have also been occasional misidentification of the level context for a few artifacts, particularly as the contact between levels was quite irregular, and sometimes quite subtle.

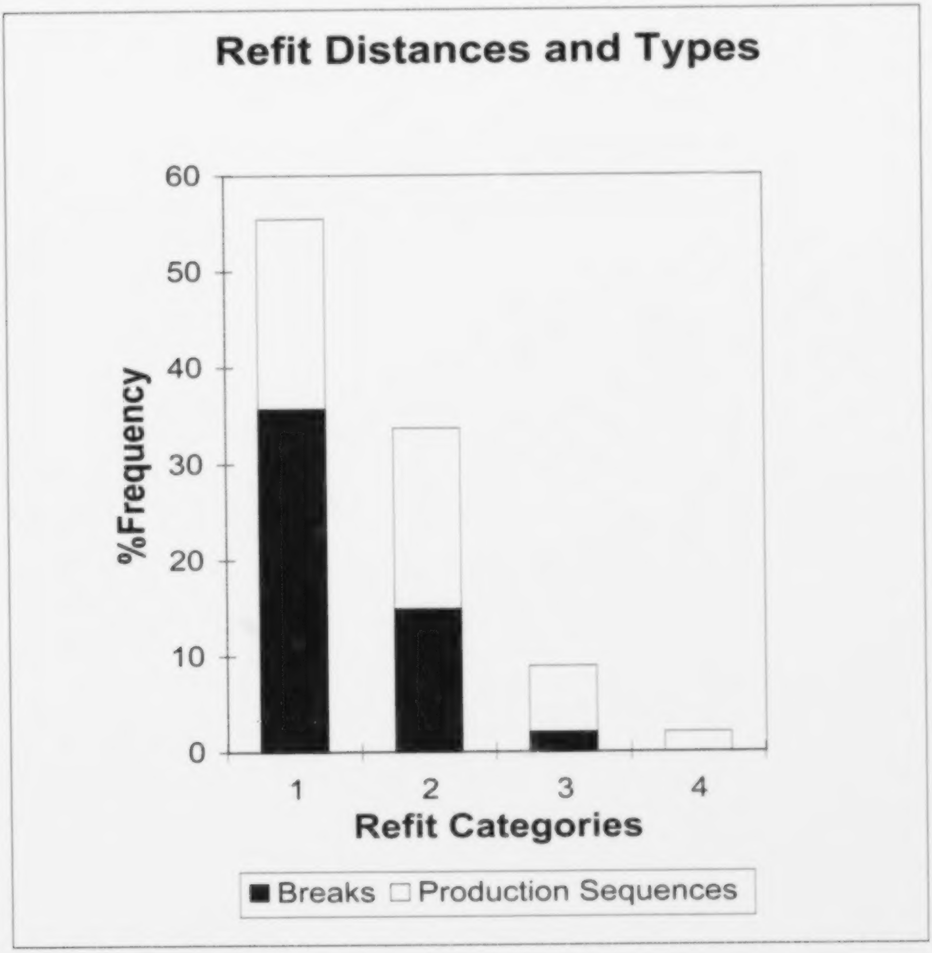


Figure 33: Distribution of Refit Types and Distances

Some support for the two rather than one level interpretation is suggested by the presence of a cluster of obsidian debitage in the northwest sector of the excavations. The majority of the 30 pieces occurred within an area of about 1.5 m in diameter. These pieces were recovered from four excavation units, dug by three different field workers. Twenty-nine pieces were assigned to level 2, and one to a level 2/3 contact (i.e., the excavator could not be absolutely certain about the level provenience). The discreteness of these obsidian artifacts and their assignment to one specific level is, I feel, sound evidence for the interpretation of at least two prehistoric cultural levels.

The technological aspect revealed by the refitting study accords well with the analysis of the debitage. All of the production sequences represent primary detachment of flakes from cores, rather secondary phases of tool manufacture, or evidence of resharpening of dulled tools, or recycling of broken ones.

Artifact Analysis

The collection from the Slump site includes lithic and organic components, although it is overwhelmingly dominated by the former. Table 3 presents a summary of the categories used in this analysis. By and large, I have used a technological approach for analysis of the collections because this method provides the greatest understanding of the interrelationships within and between elements of the assemblage as a whole, particularly as they relate to a variety of behavioural aspects. This is especially true as the Slump site lithics are characterized by a fairly low diversity of tool types, which limits the usefulness of a purely typological approach commonly used in Alberta archaeology. Elements of my approach have been adapted from previous studies (Le Blanc 1984, 1994b; Magne 1985).

Orientation rules for descriptive purposes are as follows: for bone and antler tools, the proximal end is the haft end or, if this cannot be determined, the wider end. The distal end is therefore the operating part of the implement. When the modification is minor, or the item represents production waste, the original anatomical orientation of the bone or antler is used. Where evident, the term dorsal refers to the original exterior surface of the bone or antler; ventral is therefore the interior of both types of material. Lithic tools are oriented like the bone/antler; i.e., the working end is distal, the haft portion is proximal. The dorsal face is uppermost; thus, the left and right sides or edges are to the observer's left and right respectively and this relationship is maintained when the ventral face is uppermost. In the case of non-tools or when there is difficulty in orienting an object with respect to the haft or working edges, the piece is positioned with respect to the original flake blank; i.e., the platform is proximal, and the dorsal face is the exterior surface of the blank. All other features are referenced to this orientation.

Organic Artifacts

Five bone (n=3) and antler (n=2) specimens were found. Four represent fragments of larger tools and one is a piece of antler production waste. Bone and antler tools are rather rare in southern subarctic sites, therefore, I will describe each of the these artifacts individually.

Table 3: Summary of Artifact Categories for the Slump Site

	Levels				
Category	**1**	**2**	**3**	**No Prov.**	**Totals**
ORGANIC					
Bone/Antler implements		3	2		5
Faunal Remains	28	2208	2450		4686
LITHIC					
Debitage					
Cores					
Pebble			10		10
Exploratory pebble			13		13
Bipolar pebble		8	20		28
Bipolar exploratory pebble			6		6
Cobble			41	1	42
Exploratory cobble			10		10
Fragments					
Pebble	1	5	14		20
Bipolar pebble		1	2		3
Bipolar split pebble			4		4
Cobble	1	4	73		78
Indeterminate		3	18		21
Flakes					
Bifacial		51	202		253
Core reduction	5	381	2069	3	2458
Bipolar		3	34		37
Shatter	7	502	1842	8	2359
Cobble Spalls					
Complete		19	51		70
Fragments		5	32		37
Implements					
Abrader fragments		2			2
Anvils			3		3
Anvil/Cores			4		4
Bifaces					
Projectile Points		2	7		9
Toolss		2	1		3
Preforms			2	1	3
Choppers					
Cobble		1	4		5
Cobble core			3		3

Table 3: Summary of Artifact Categories for the Slump Site *(continued)*

	Levels				
Category	**1**	**2**	**3**	**No Prov.**	**Totals**
Hammerstones		1	24	1	26
Hammerstone/Cores			13		13
Hammerstone/Anvils			9		9
Hammerstone/Anvil/Cores			2		2
Pièces Esquillées		5	10		15
Scrapers					
End		3	13		16
Side		4	9		13
Combination (end/side)		2	2		4
Fragments			3		3
Retouched/Utilized Flakes					
Bifacial		1	10		11
Core reduction		5	39		44
Bipolar			3		3
Shatter		1	29		30
Retouched/Utilized Spalls					
Complete		6	41		47
Fragments			13		13
Modified Fire-broken rock	1	19	682	12	714
Totals	43	3247	7819	26	11135

The first bone specimen is a small fragment (level 3: l. 15.4 mm; w. 9.7 mm; t 4.8 mm) that has a short groove on the original external cortex surface (Figure 34e). There are also some miscellaneous scratch marks on the same surface. Another specimen (level 2: l. 11.0 mm; w. 4.1 mm; t. 1.7 mm) appears to be the tip of some type of awl (Figure 34d). There is wear or polish over most of its surface. The last bone specimen is made of bird ong bone (level 2: l. 24.8 mm; w. 8.2 mm; w. 1.6 mm) and is broken on either end (Figure 34c). The left edge has been whittled and polished to a rounded configuration; the opposing edge is broken. The exterior (cortical) surface has several striations more-or-less parallel to the long axis; the surface is also polished. This specimen could be an awl fragment. However, in the Arctic, large bird long bones were frequently used as cores for the production of sewing needles (e.g. Le Blanc 1994b; Plate 11); given the need for tailored clothing in the boreal forest, needles would certainly be expected.

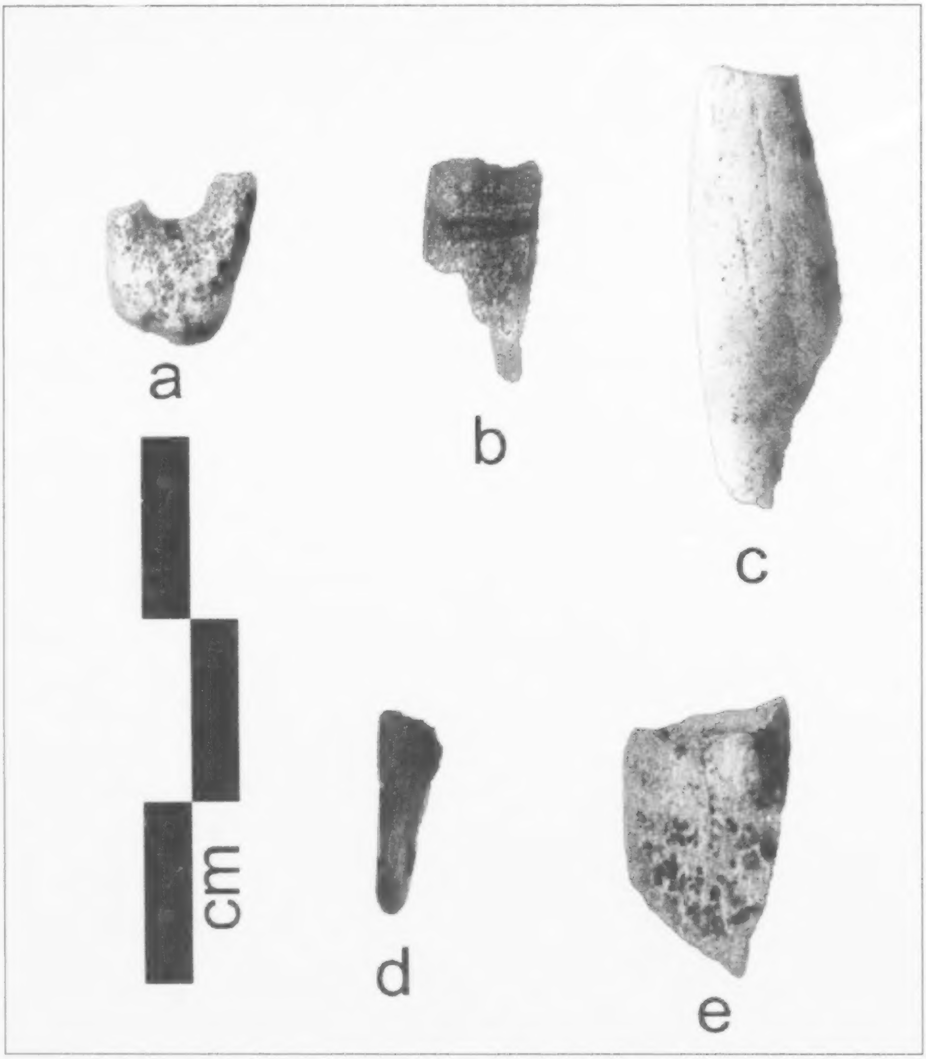


Figure 34: Organic Tool Fragments: (a) 3788, (b) 3630, (c) 4552, (d) 8095, (e) 2114. Level 2: a, c-d; Level 3: b, e

The first antler specimen consists of a small (level 3: l. 12.1; w. 6.4 mm; t. 5.1 mm) piece of production debris (Figure 34b). It has three transverse cut marks on the original cortex antler surface. The second object (level 2: l. 9.7 mm; w. 7.7 mm; t. 4.7 mm) appears to have been the proximal end of an implement with a suspension hole with an original diameter of approximately 2.7 mm; the implement broke through the hole (Figure 34a).

Lithic Artifacts

Raw Materials

Table 4 summarizes the distribution of raw materials by category. Quartzites, which dominate (86.2%) the assemblage, vary from coarse grainy varieties to glassy-like or as described here, vitreous. Chert is a distant second (9.4%) with the remainder occurring essentially as trace frequencies. With the exception of obsidian (see below), which is exotic and likely comes from interior British Columbia (Bailey n.d.), the lithics were locally obtained. At present, the beach in front of the Slump site consists of sedimentary bedrock covered with pebbles and cobbles that derive from large gravel deposits of glacio-fluvial origin that begin just 20 m west of the site, and cover a wide area north of Shaw Point. Indeed, the terrace west of the Slump site, which is about 2 m lower, has cobbles just under the surface, as indicated by exposed areas of cobbles where vehicles have broken through the surface, often becoming stuck as the cobbles act rather like ball bearings providing virtually no traction. The cobbles are also exposed along the terrace face where they are subject to erosional forces of ice-scour at spring breakup, and wave-action during summer storms. In either case, a near inexhaustible supply of material would have been available to the inhabitants of the site. Depending on storms and currents, the pebbles and cobbles may appear as a lag deposit, or in thick ridge-like formations. Chert and siltstone pebbles were easily collected from these ridges, during the several years of fieldwork at the site.

Table 4: Distribution of Raw Materials

	Levels				
Material	**1**	**2**	**3**	**None**	**Totals**
Agate			21		21
Chert	2	17	566	3	588
Granite		2	15		17
Jasper		1	57		58
Obsidian		29	1		30
Petrified wood		3	5		8
Porphorhytic rhyolite		1			1
Quartz		17	86		103
Quartzite	18	945	5193	45	6201
Siliceous siltstone		3	8		11
Siltstone	1	10	70		81
Vitreous Quartzite	1	72	155		228
Totals	**22**	**1100**	**6177**	**48**	**7347**

Debitage

Given the low diversity of artifact categories at the Slump I have devoted considerable effort to a detailed analysis of by far the major category of artifacts at the site, namely the flakes and cores. To do so, I have used an approach described in elsewhere (Le Blanc 1994b:54-56), but modified for the present situation. Briefly, this approach uses the following variables:

- Debitage Type: biface reduction flake, core reduction flake, shatter, core fragment, bipolar flake, pebble core, exploratory pebble core, bipolar pebble core, bipolar exploratory core, cobble core, exploratory cobble core, cobble spall, and cobble spall fragment.
- Raw materials: quartzite, vitreous quartzite, quartz, chert, siliceous siltstone, petrified wood, jasper, agate, obsidian, granite.
- Size: the smallest 5 x 5 mm square into which the object can be placed. In addition, the weight to the nearest 0.1 gram was recorded.
- Dorsal surface scars: cortex, 1 scar, 2 scars, 3 or more scars.
- Platform scars: cortex, 1 scar, 2 scars, 3 or more scars, ridge platform, indeterminate.
- Presence of platform grinding: absent, present, not applicable.
- Percentage of dorsal cortex: none, 1–50%, 51–99%, 100%.

The differences with the referenced study include debitage types more appropriate to the Slump site assemblage (the 1994 study was used in the analysis of a Palaeoeskimo assemblage from the western Canadian Arctic), the addition of variable states for cortex-covered dorsal faces and platforms (rather than being grouped with 1 scar), and including a variable to monitor the amount of dorsal face cortex cover. The flake category includes all bifacial and core reduction varieties. For the shatter, only the pieces with point provenience were included in the analysis; thus, shatter recovered from the screen was excluded from the more detailed analysis presented below. Table 5 presents a summary of the debitage by type and raw material that was subjected to analysis.

Cores

Table 6 presents a summary of weights for the various categories of cores; Figure 36 displays size distributions for groupings of pebble and cobble varieties. Note that the sample included in the table and figures does not include multi-use cores such as core/hammerstones, etc.; these are treated separately. The core sample is almost equally divided between cobble and pebble varieties (Figures 35–38). Generally, the separation between the two is based on size, the cutoff point being 65 mm in diameter, following geological practice; thus, cobble cores are larger than 65 mm in maximum dimension.

Table 5: Distribution of Raw Material by Debitage Type

Level	Type	Quartzite	Vit. Quartzite	Quartz	Chert	Sil. Siltstone	Siltstone	Pet. Wood	Jasper	Agate	Obsidian	Granite	Totals
	Core flake	5											5
1	Shatter	5	1		1								7
	Core frag.					2							2
Subtotals		10	1		1	2							14
	Biface flake	27	7		15								49
	Core flake	306	18	4	29	3	2	1			12		375
	Bipolar flk.		1		1	1							3
2	Shatter	30	31	6	39	3	2	2			15	1	129
	Cobble spall	19											19
	Cob. spall frag.	5											5
	Bip. peb. core	1	2		3	1					1		8
	Core frag.	6		2	2	2			1				13
Subtotals		394	59	12	89	10	4	3	1		28	1	601
	Biface flake	12	26		33	8	1		1		1		82
	Core flake	1756	91	25	10	11	7		6	3	1		1910
	Bipolar flk.	13	4		11	3							31
	Shatter	1038	75	41	174	41	5	4	6	6		2	1392
	Cobble spall	50		1									51
	Cob. spall frag.	32											32
3	Pebble core	5	1	1	1	2							10
	Expl. pebble core	9		1	1	1		1					13
	Bip. peb. core	8		2	5	3				1			19
	Bip. expl. peb. core	2			2		1						5
	Cobble core	40		1									41
	Exp. cob. core	10											10
	Core frag.	80	2	2	4	2		1	19				110
Subtotals		3055	199	74	241	71	14	6	32	10	2	2	3706
	Cobble core	1											1
Grand Totals		3460	259	86	331	83	18	9	33	10	30	3	4322

As indicated in Table 5, the majority of pebble cores are made of either of the two varieties of quartzite; only 12 of the non-fragmentary examples are of chert. The remaining cores are found in reduced frequencies of the other materials. Of note is the presence of a bipolar obsidian core in level 2, indicating that some obsidian was brought to the site in a primary state, and was processed on-site.

Four pieces of the obsidian were analyzed to determine the probable source (Bailey 1995). Results indicate that:

> *All four artifact samples originated at the Anahim source, which is located in the Rainbow Range near the central coast of British Columbia…One known prehistoric collection locality is on Obsidian Creek, but the actual source is thought to be located further upstream (Nelson and Will 1976). Anahim obsidian occurs quite commonly in archaeological assemblages found in British Columbia, ranging from the west coast, through central B.C., to the headwaters of the Peace River in Alberta (Carlson 1994). The present results indicate the easternmost occurrence of Anahim obsidian known to the author. (Bailey 1995)*

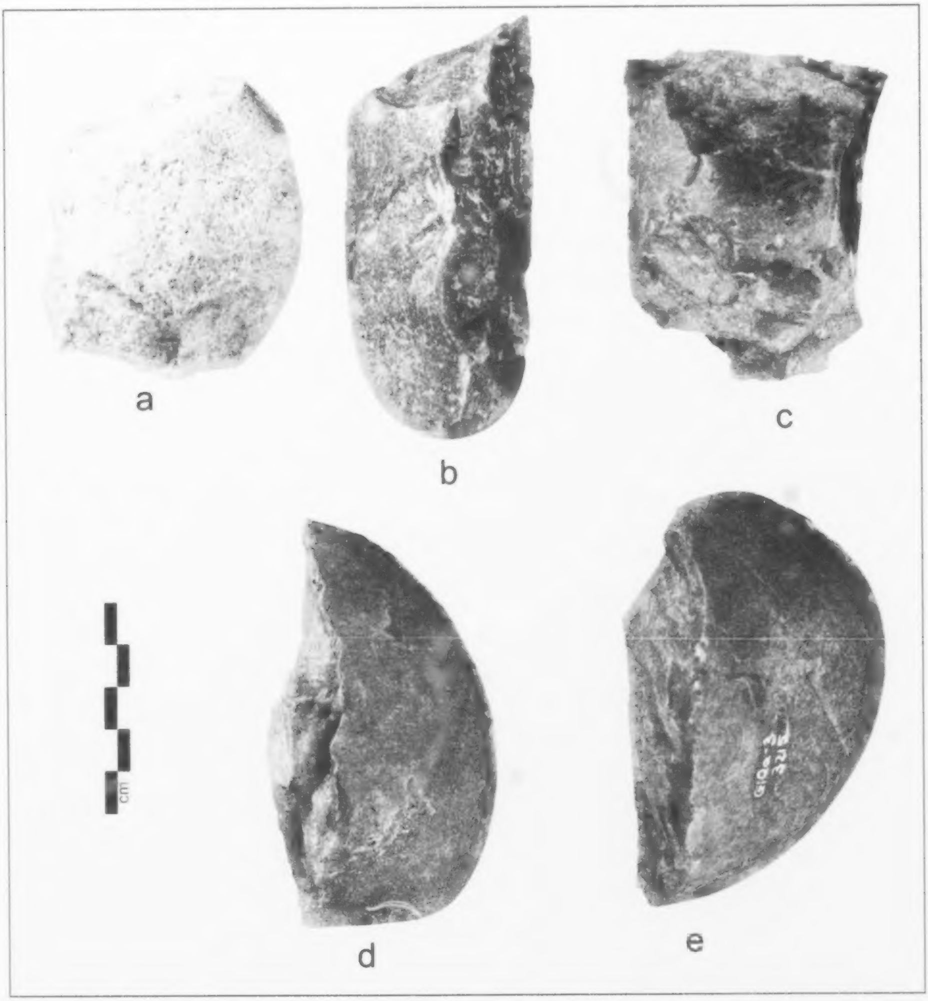


Figure 35: Cobble Cores: (a) 1806, (b) 7158, (c) 1804, (c) 6110, (e) 3215. All from level 3

One would reasonably expect to find, given the straight-line distance of approximately 1000 kilometres by air, a finished or broken obsidian tool, or perhaps some bifacial thinning flakes that derived from resharpening a tool. However, the obsidian debitage that was found consists of a core, flakes and shatter, and a small pièce esquillée. In addition, virtually all of this material was found in a fairly circumscribed area. Taken together, the obsidian from level 2 (there is only one piece in level 3) likely represents a single reduction episode, likely of a small pebble.

Although not indicated in Table 4, there was also one piece of porphorhytic rhyolite (identification by Dr. P. Erdmer, Earth and Atmospheric Sciences, University

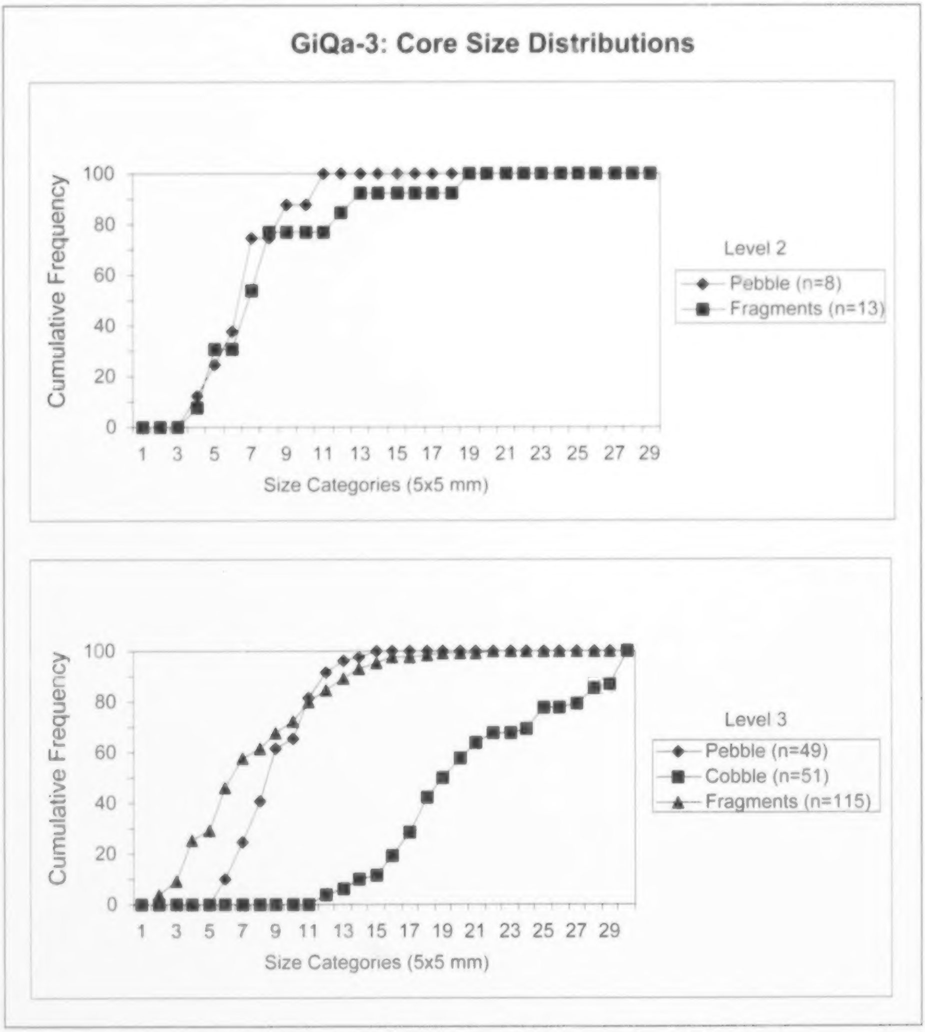


Figure 36: Slump Site Core Size Distributions

Table 6: Summary Statistics for Cores

Level	Weight	Pebble	Expl. Pebble	Bipolar pebble	Bip. expl. pebble	Cobble	Exp. cobble	Fragments
1	N							2
	Min.							13.9
	Max.							19.6
	Mean							16.8
	S. dev.							4.0
2	N			8				13
	Min.			1.8				2.3
	Max.			70.8				231.0
	Mean			17.1				39.2
	S. dev.			22.5				64.3
3	N	10	13	20	6	41	10	115
	Min.	16.7	17.9	6.9	18.8	95.9	107.4	3.9
	Max.	208.4	139.3	67.1	116.2	2610.0	2104.2	1709.0
	Mean	58.2	58.8	24.3	63.2	568.4	816.8	86.4
	S. dev.	57.0	41.4	16.4	36.3	561.3	599.4	179.9
N.P.	N					1		
	Min.							
	Max.							
	Mean					122.1		
	S. dev.							
Totals	N	10	13	28	6	42	10	130
	Min.	16.7	17.9	1.8	18.8	95.9	107.4	2.3
	Max.	208.4	139.3	70.8	116.2	2610.0	2104.2	1709.0
	Mean	58.2	58.8	22.3	63.2	584.1	816.8	80.6
	S. dev.	57.0	41.4	18.2	36.3	563.6	599.4	171.0

of Alberta, August 1995). The likely source for this material is the Canadian Shield, a portion of which reaches into the far northeast corner of Alberta along the Slave River. The Slump site specimen (#8538, 3.3 g) is a core fragment.

Like the obsidian, the question remains as to how these materials arrived at the Slump site, since the Canadian Shield is several hundred kilometres away. Direct procurement is very unlikely, and inter-group trade seems equally implausible because of the expedient nature of both; i.e., neither is a tool or tool fragment that could have been curated. A possible explanation is that pebbles of both materials were found in gravel deposits in the Lesser Slave Lake region that were naturally transported, perhaps by Cordilleran ice in the case of the obsidian or Laurentide ice for the rhyolite.

Meltzer (1989:13) has commented on a similar situation with respect to the presence of exotic lithic materials in Eastern North American Palaeoindian assemblages. Rather than visiting bedrock sources of desirable material, he suggests that Palaeoindian people obtained what would otherwise be exotic material by collecting pebbles and cobbles from glacial deposits. He refers to this as "Direct Acquisition from Secondary Sources," and indicates that such a pattern of lithic procurement would be more likely to have occurred in northern, glaciated regions, where chert cobbles can comprise a sizeable portion of easily accessible glacial debris (Meltzer 1989:18).

Evidence for the use of the bipolar flaking technique appears in levels 2 and 3; indeed, all of the pebble cores in level 2 were processed using the bipolar technique. In level 3, just over half of the pebble cores were bipolar flaked (n=26; 53.1%). Only one of the quartzite cobble cores was bipolar flaked; this a quartzite example from level 3 that was also used as an anvil, and is included in the core/anvil category (Figure 38b).

Several cores have been classified as exploratory. These represented pebbles and cobbles that were tested for flaking suitability; they have also been called casual cores (Isaac 1977:176). Presumably, cobbles and pebbles were brought to the site for testing, found to be unsuitable then discarded. A few cores and core fragments could be refitted with flakes that had been detached from them. This group includes two pebble cores in level 3; four bipolar pebble cores (e.g., Figure 37f), three in level 3, one a level 2/3 refit; four cobble cores, all from level 3; and nine fragments from level 3 and one a level 2/3 combination. The latter group includes a refit across 6.9 m between a flake and its core.

Flakes and Shatter

Table 7 displays summary data for the weight for unmodified flakes and shatter. Figure 39 displays a summary of the sizes for levels 2 and 3 (level 1 has been omitted from further consideration as the sample size is too small for analysis) of the various types.

Bifacial Flakes

To investigate the possible influence of raw material on reduction strategies, it is necessary to compare the bifacial and core flake types with respect to size and reduction stage for the three major raw materials: quartzite, vitreous quartzite, and chert.

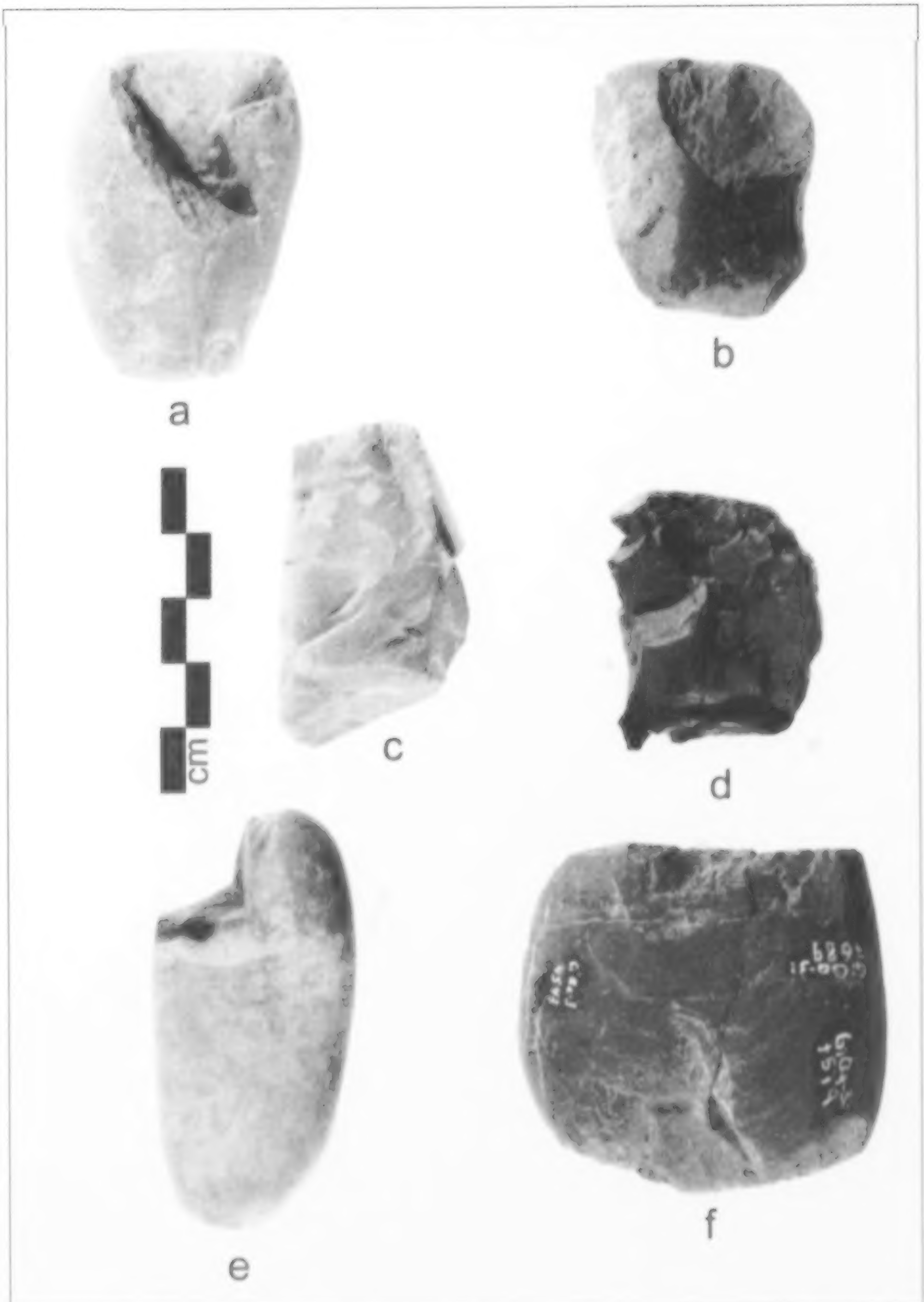


Figure 37: Bipolar Cores: (a) 2239, (b) 3642, (c) 5922, (c) 7754, (e) 2175, (f) 4543. a-c, level 3; c-e, level 2

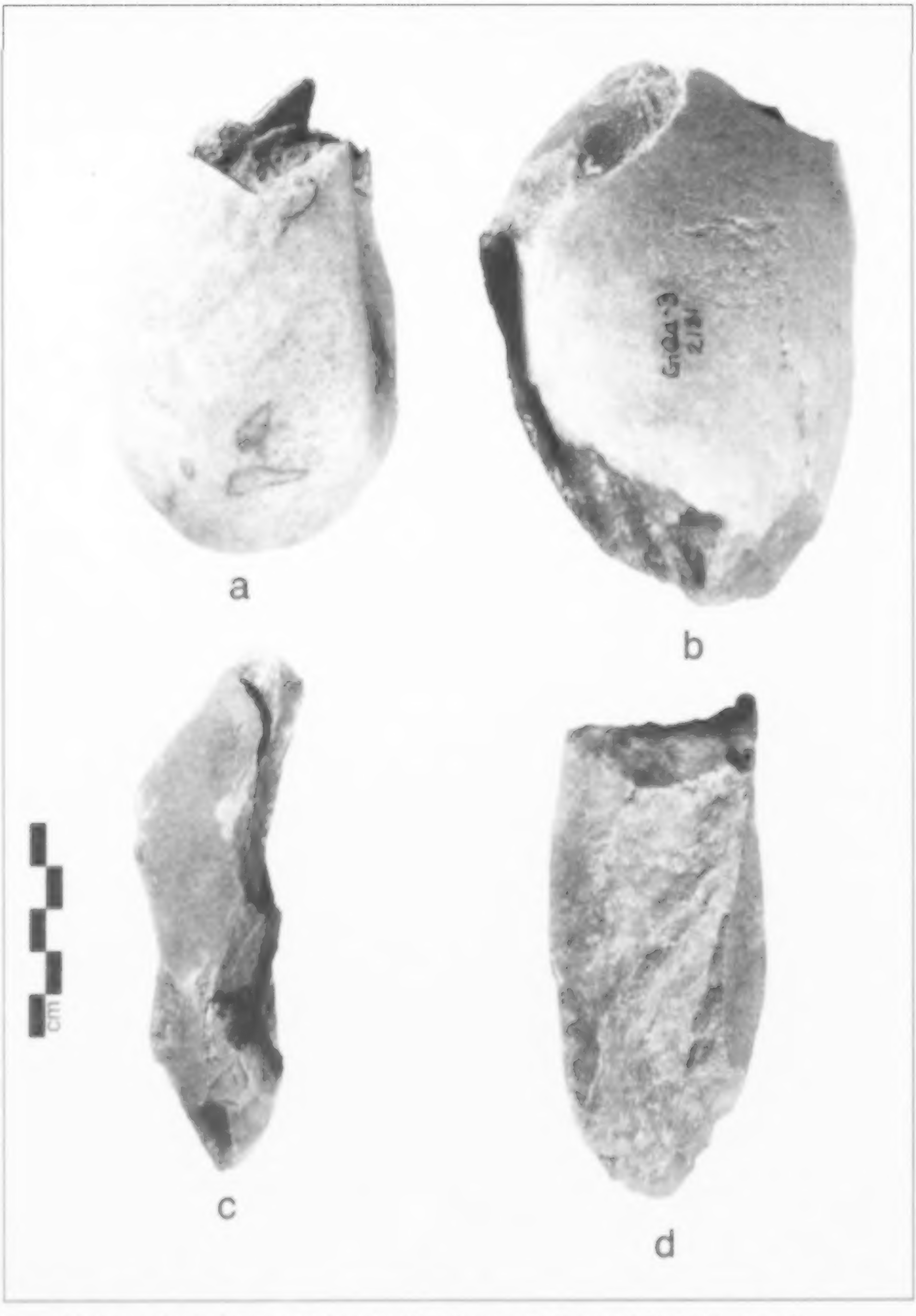


Figure 38: Cobble Cores: Refitted (a) 7344; (c) 4565; Bipolar (b) 2181; (d) 7153. All from level 3

Figure 40 displays cumulative frequency curves for 5x5 mm size categories for bifacial flakes for levels 2 and 3. Bifacial flakes account for only 5.4% of the flakes and shatter category, suggesting that little biface manufacturing or resharpening was occurring on-site. The diagrams show that chert and vitreous quartzite are similar with greater numbers of smaller flakes being present, as compared to quartzite proper. This preliminary observation could be due to the influence of raw material, different reduction trajectories within the bifacial category or a combination of these factors. To examine this finding more closely, I have compiled the debitage information into a series of diagrams that reflect the reduction stage by raw material (Figure 41).

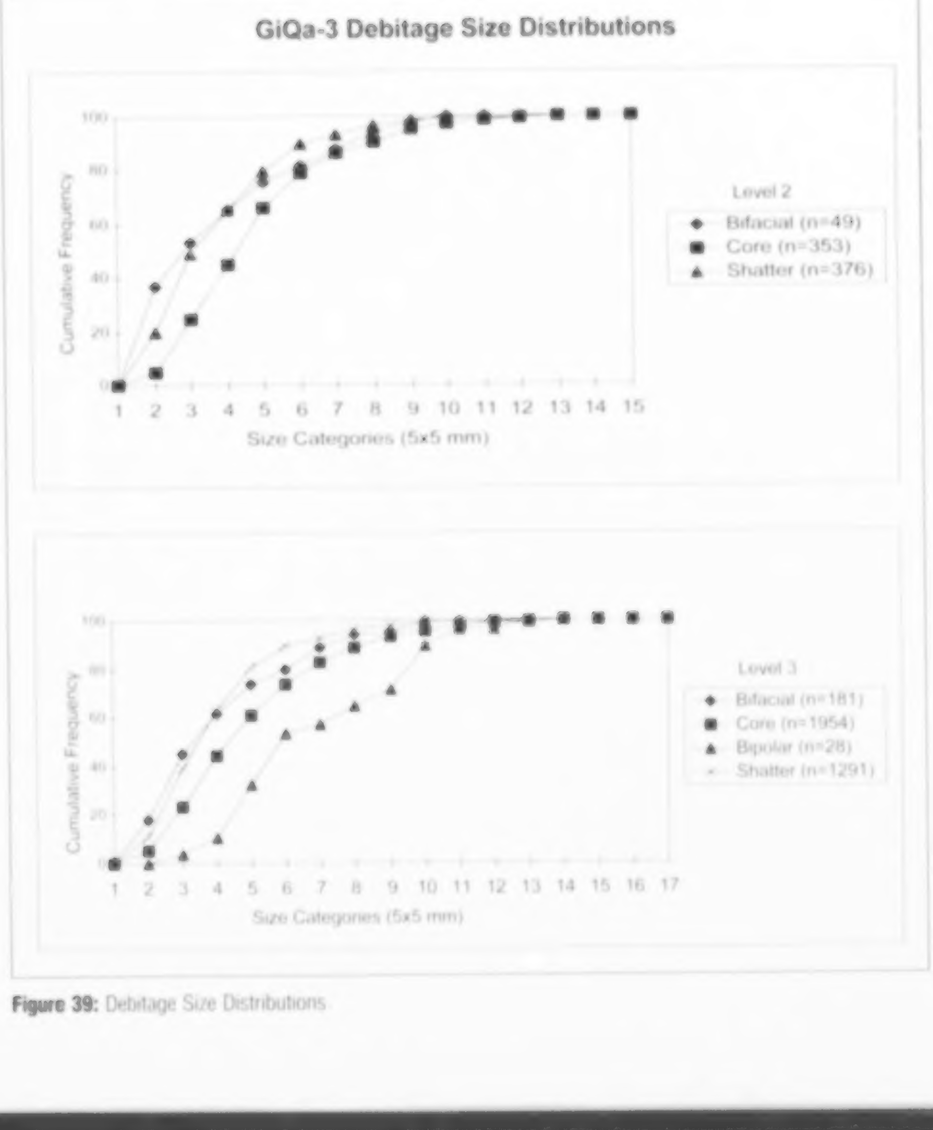


Figure 39: Debitage Size Distributions.

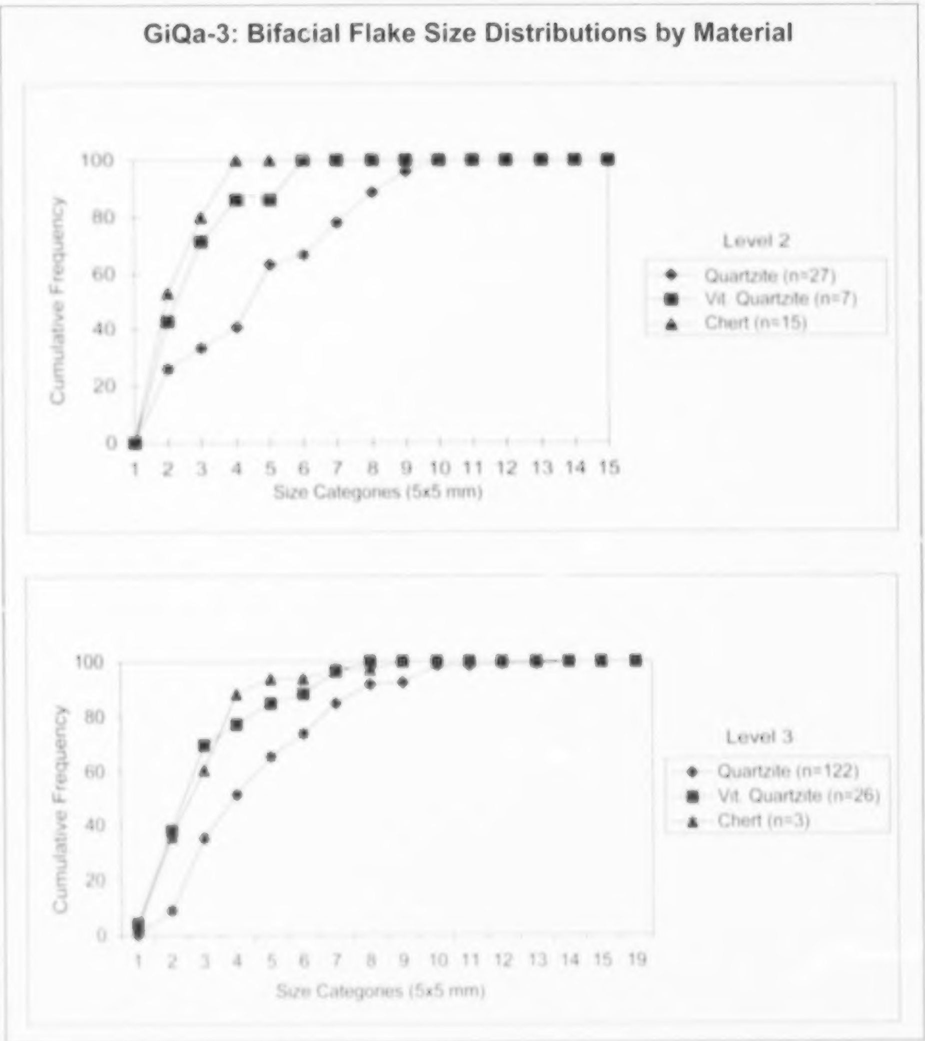


Figure 40: Bifacial Flake Sizes by Major Raw Materials

Chert behaves in a similar fashion in both levels, namely, poorly represented in the early stages of reduction. These low frequencies suggest that few if any bifaces of this material were made at the site. Rather it appears that bifacially flaked chert tools were brought in as finished or near finished tools and resharpened on-site. The few chert bifaces that were actually found accord well with these findings.

For quartzites, the coarser variety is represented by substantial numbers of early reduction stage flakes, suggesting strongly that early stages of reduction occurred on site; that is, bifacial cores or bifaces were being produced, although few actually appear in the collection. The behaviour of vitreous quartzite is difficult to assess for level 2, as the sample is too small. The situation is better for level 3, however, since glassy quartzite tracks quite closely the coarser variety, with the early stages of reduction being well represented. Clearly, early bifacial reduction of vitreous quartzite is occurring on-site, but it is rather smaller than the coarser material, perhaps because it occurs in primary form as smaller pebbles and cobbles. Production of vitreous quartzite bifacial tools may have been occurring on-site, although, once again, there may be some overlap in reduction strategies.

Table 7: Summary Weight Statistics for Flakes and Shatter

Level	Type	Weight	Quartzite	Vit. quartzite	Quartz	Chert	Sil. siltstone	Siltstone	Pet. Wood	Jasper	Agate	Obsidian	Granite	Totals
1	Core	N	5											5
		Min.	0.8											0.8
		Max.	10.8											10.8
		Mean	3.1											3.1
		S. dev.	4.3											4.3
	Shatter	N	5	1		1								7
		Min.	0.3											0.1
		Max.	1.2											1.2
		Mean	0.6	0.1										0.6
		S. dev.	0.4											0.4
2	Bifacial	N	28	8		15								51
		Min.	0.1	0.1		0.1								0.1
		Max.	19.2	4.6		0.8								19.2
		Mean	3.5	0.9		0.2								2.1
		S. dev.	4.8	1.54		0.3								3.9
	Core	N	307	18	4	31	4	2	1			11		378
		Min.	0.1	0.1	0.7	0.1	0.3	0.8				0.1		0.1
		Max.	35.4	4.7	2.0	10.1	18.6	5.2						35.4
		Mean	3.9	1.3	1.3	1.9	6.3	3.0	0.5			0.7		3.5
		S. dev.	6.1	1.3	0.5	2.5	8.5	3.1				1.1		5.7

Table 7: Summary Weight Statistics for Flakes and Shatter *(continued)*

Level	Type	Weight	Quartzite	Vit. quartzite	Quartz	Chert	Sil. siltstone	Siltstone	Pet. Wood	Jasper	Agate	Obsidian	Granite	Totals
2	Bipolar	N		1		1	1							3
		Min.												
		Max.												
		Mean		0.6		7.5	10.7							6.3
		S.Dev.												5.2
	Shatter	N	308	31	6	39	3	2	2			15	1	407
		Min.	0.1	0.1	0.1	0.1	1.1	0.7	0.7			0.1		0.1
		Max.	33.2	3.1	19.5	5.2	2.8	3.0	2.2			1.0		33.2
		Mean	1.9	0.7	3.6	0.8	1.7	1.9	1.5			0.2	5.0	1.7
		S.Dev.	3.9	0.8	7.8	1.1	0.9	1.6	1.1			0.2		3.6
3	Bifacial	N	128	28		34	8	1		1				201
		Min.	0.1	0.1		0.1	0.1							0.1
		Max.	43.2	5.7		4.6	3.1							43.2
		Mean	3.3	0.9		0.6	0.9	6.1		0.2				2.4
		S.Dev.	5.8	1.4		0.8	1.1							4.8
	Core	N	1780	93	26	119	11	8		6	3	1		2047
		Min.	0.1	0.1	0.2	0.1	0.1	0.2		0.5	7.9			0.1
		Max.	78.6	43.7	12.1	18.0	10.7	46.1		25.5	12.6			78.6
		Mean	5.5	2.0	2.0	1.5	2.5	8.0		7.2	10.6	0.1		5.0
		S.Dev.	8.7	5.2	2.8	2.3	3.2	15.8		9.3	2.4			8.4
	Bipolar	N	13	4		12	4			1				34
		Min.	2.4	1.0		1.2	3.6							1.0
		Max.	43.6	9.5		24.9	16.6							43.6
		Mean	23.7	3.7		6.6	9.4			6.7				13.1
		S.Dev.	12.9	3.9		6.6	5.4			2.3				12.4
	Shatter	N	1051	81	41	183	42	5	4	6	6		3	1421
		Min.	0.1	0.1	0.1	0.1	0.1	0.1	2.0	0.1	0.2		0.5	0.1
		Max.	60.8	8.9	9.3	6.9	5.4	10.6	3.6	6.0	1.4		64.6	64.6
		Mean	2.4	1.1	1.2	0.8	0.8	3.3	2.5	1.7	0.8		32.5	2.1
		S.Dev	4.4	1.6	1.9	1.1	1.1	4.3	0.7	2.3	0.5		45.3	4.3
	Totals	N	3625	265	77	435	73	18	7	14	9	28	3	4554
		Min.	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.2	0.1	0.5	0.1
		Max.	78.6	43.7	19.5	24.9	18.6	46.1	3.6	25.5	12.6	5.6	64.6	78.6
		Mean	4.1	1.4	1.6	1.2	2.1	5.4	1.9	4.3	4.1	0.6	23.4	3.6
		S.Dev.	7.3	3.3	3.0	2.2	3.5	10.7	1.0	6.6	5.1	1.2	35.8	6.8

Core Flakes

Flakes derived from core reduction rather than bifacial flaking techniques are much more common (level 2, 44.9%; level 3, 55%). Size distributions for the major raw materials are displayed on Figure 42.

Chert and vitreous quartzite track one another quite closely in terms of size for both levels, with approximately 8% falling in the 5 or less size category (i.e., 25 mm or less in maximum dimension). Thus, the core flakes accord well with the biface flakes, once again suggesting the small size of the primary cores.

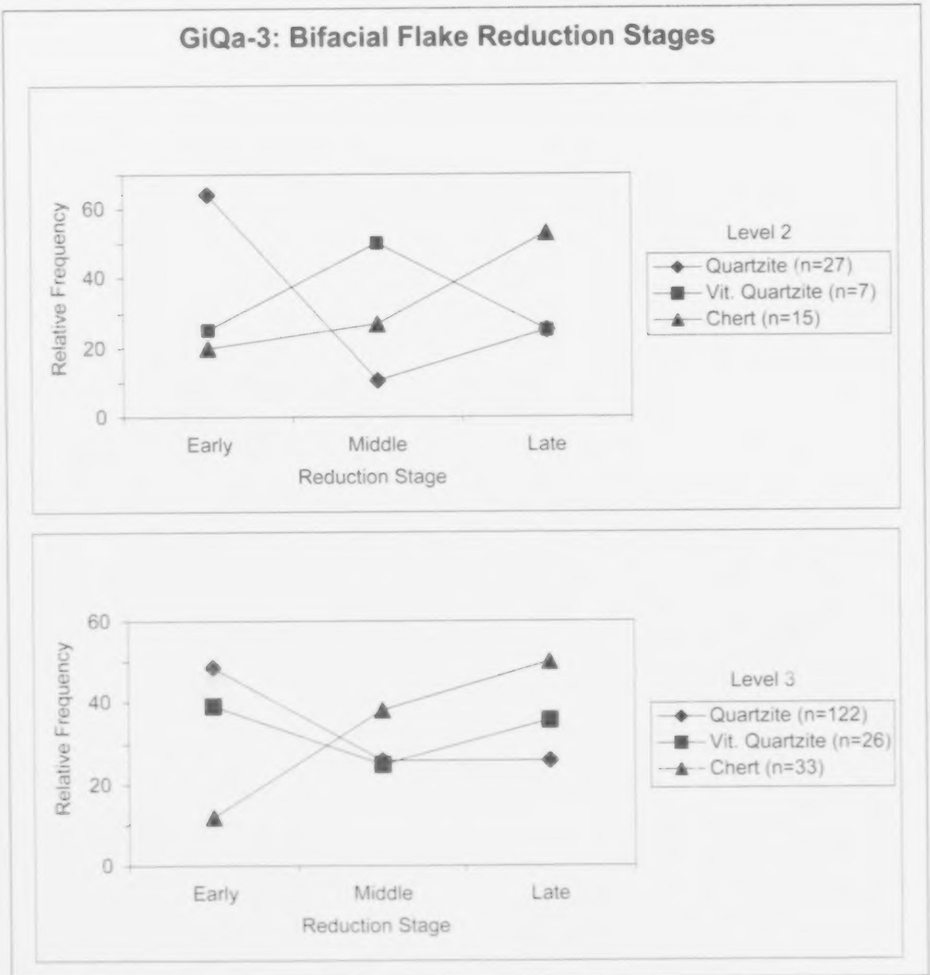


Figure 41: Reduction Stages by Major Raw Materials for Bifacial Flakes

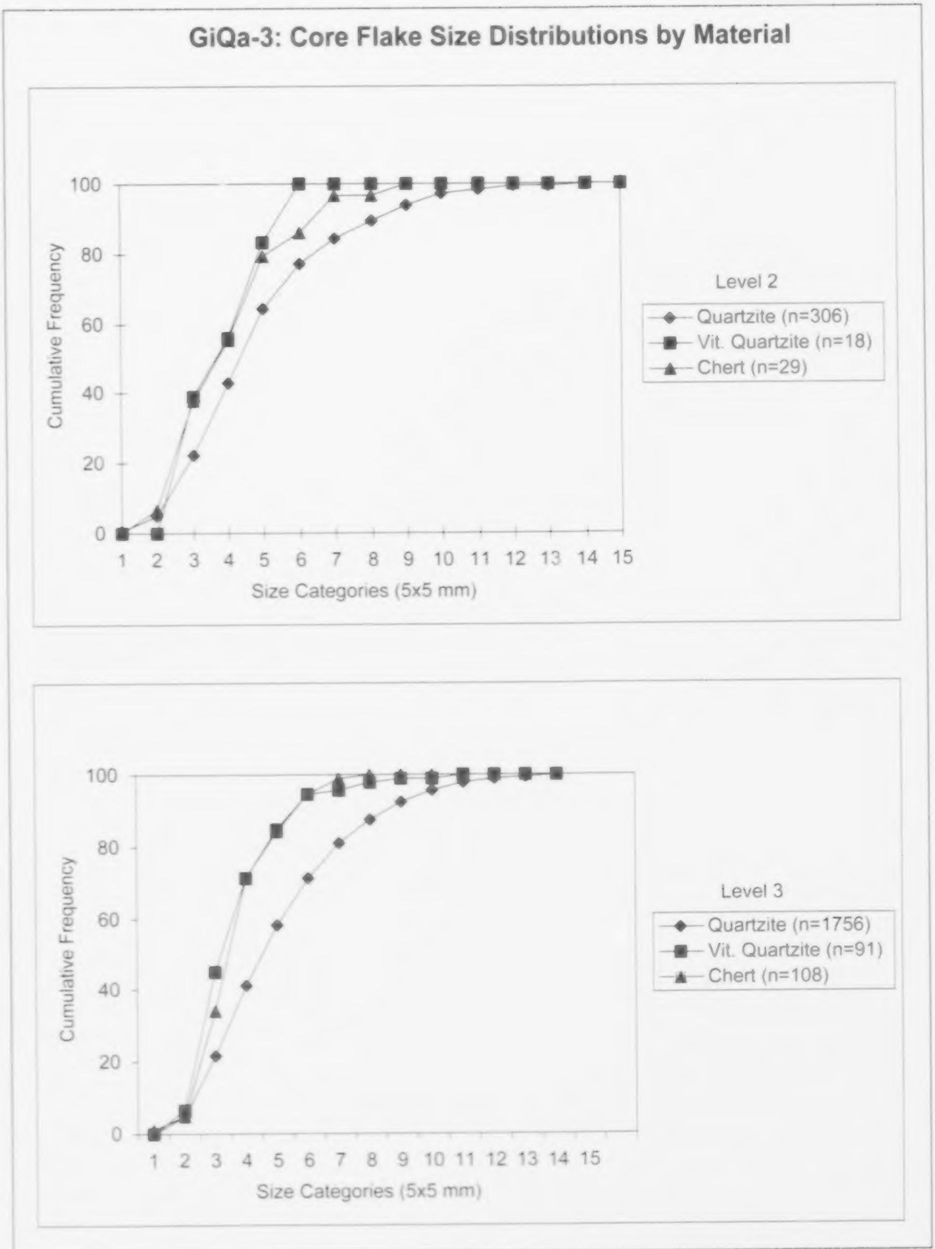


Figure 42: Core Flake Sizes by Material

Figure 43 shows the core flakes with respect to reduction stage. The data for level 2 are too limited to interpret for the vitreous quartzite and chert. Most of the coarse quartzite (93.1%), however, belongs to early and middle reduction stages. Clearly, primary flake production comprises a major component of quartzite reduction. A similar situation exists in level 3 with respect to quartzite, but interestingly, the chert and vitreous quartzite are very similar to the coarse quartzite, with the majority being early and middle stage flakes. However, some 17% of both of these materials are late stage flakes, suggesting that some non-bifacial tool making may have been occurring on-site, perhaps the production of scrapers, the most well-represented tool-type.

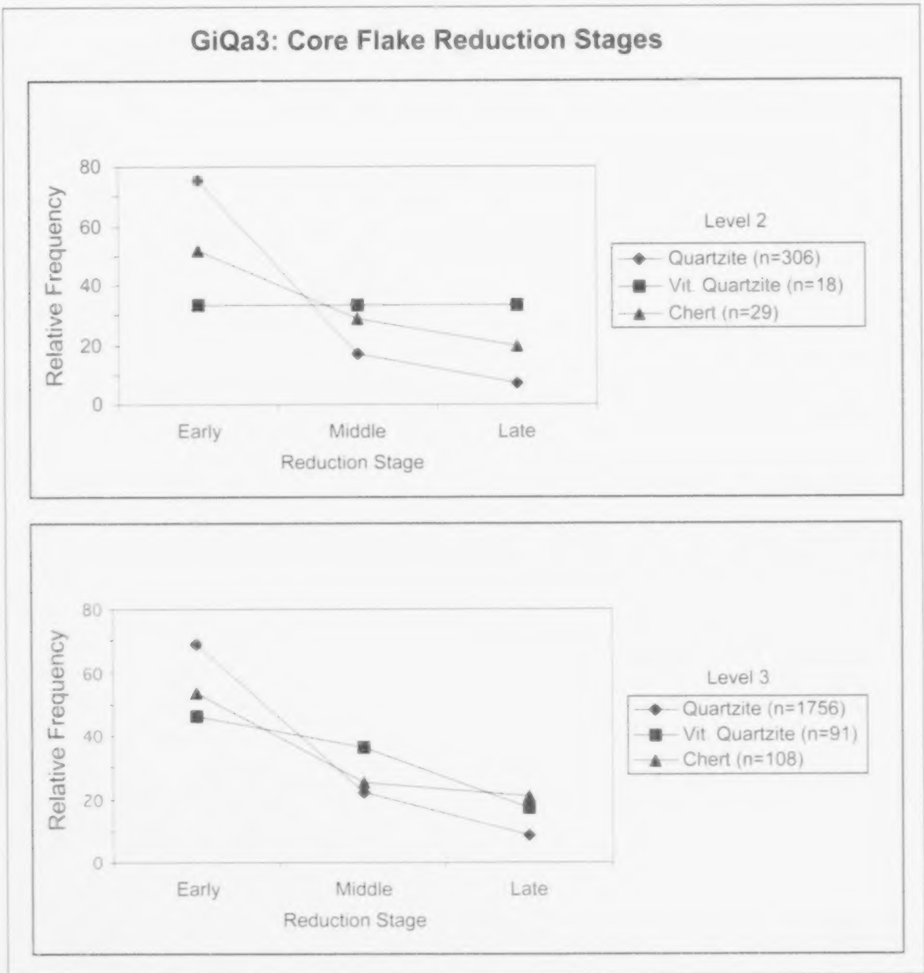


Figure 43: Reduction Stage by Raw Material for Core Flakes

Cobble Spalls

Cobble spalls are simply large flakes, but because they are of such substantial size, they are grouped into a separate category. Table 8 presents a summary of information of weights for unmodified spalls, which have no evidence of use wear or retouch. Size distributions for complete specimens are shown on Figure 44. Modified cobble spalls are treated below.

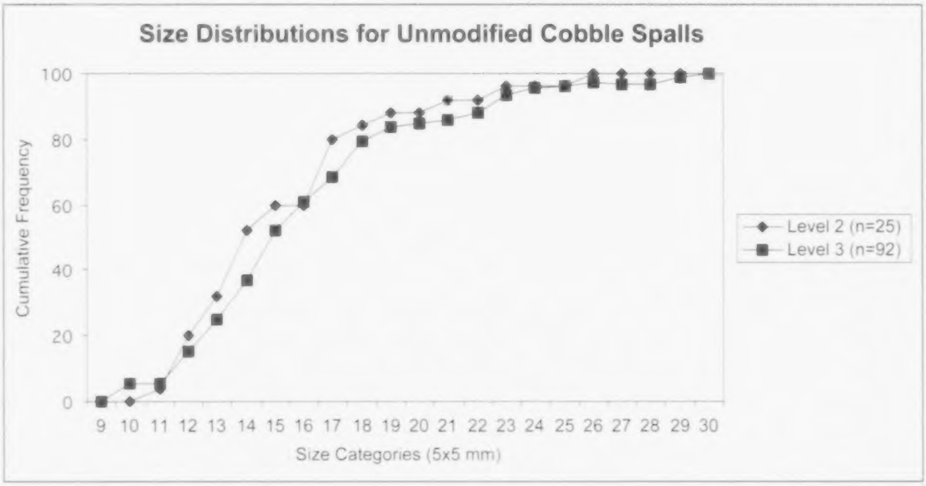


Figure 44: Cobble Spall Sizes

Except for one quartz specimen in level 3, all of the spalls are made of quartzite, and were presumably obtained from large waterworn quartzite cobble cores. Spall sizes accord well with the size distributions recorded for the cobble cores; in the latter, 80% of the cobble core assemblage exceeds the 16 (≤ 80 mm) size category, whereas 40% of the spalls fall into the same range. Curiously, and despite a concerted effort, no spalls could be refitted to their cores. This situation could suggest that after initial production of the spalls, most of which are completely cortex-covered (n=41, 58.6%) or retain a portion thereof (n=17, 24.2%), reduction continued and in the process, the large initial scars were obliterated as core sizes and flake sizes diminished. This clearly fits with expectations of the core reduction model.

However, there is another possibility to explain the lack of any refits. Only a few of the cobble cores found were reduced to such an extent that the greater part of the cortex was removed, and the number of spalls clearly exceeds the capacity of these few cores to produce them. I would therefore argue that at least some of the spalls found on the site were produced elsewhere, possibly on the beach, then carried to the site for some purpose. The presence of some 60 complete and broken modified spalls suggest they were important sources of tools. In this regard, spall tools have been described as hide working tools, particularly in the northern Athapaskan and the Arctic areas (e.g., Birket-Smith 1958; Morlan 1973:251; Rainey 1939:360; Shinkwin 1978:119-120). Eyman (1968) has also indicated that they were used as butchering tools on the plains. This latter interpretation was tested by one of the students taking the field school at the Slump site. The experiment demonstrated that replicated spalls were effective for butchering fish (Shafiq n.d.), which would not be an unexpected activity given the lake-side location of the Slump site and the historic reputation for the excellence of the fishery in this area of the lake.

Table 8: Summary of Weight Statistics for Unmodified Cobble Spalls

		Spall Type		
Level	**Weight**	**Complete**	**Fragments**	**Totals**
2	N	19	5	24
	Min.	29.4	26.8	26.8
	Max.	453.0	87.2	453.0
	Mean	94.1	53.2	85.6
	S.Dev.	92.3	26.9	84.2
3	N	51	32	83
	Min.	18.1	7.1	7.1
	Max.	727.4	253.6	727.4
	Mean	129.3	77.1	109.2
	S.Dev.	129.0	57.3	109.7
Totals	N	70	37	107
	Min.	18.1	7.1	7.1
	Max.	727.4	253.6	727.4
	Mean	119.8	73.8	103.9
	S.Dev.	120.5	54.6	104.6

Modified Fire-Broken Rock

As mentioned in the discussion of features, there was a substantial amount of burnt or thermally altered rock (as indicated by a "sugary" texture; Dawe 1984) that had been intentionally broken (Table 9); that is, pieces exhibit points of percussion, usually associated with crushing near the area of the blow, and subtle but nonetheless obvious force lines radiating from the area of the blows. The crushing is likely attributable to the use of the bipolar technique, using anvils to support small pebbles (by far the majority) that served as the source for these objects, many of which resemble segments of oranges. The interpretation concerning how these artifacts were produced is suggested by the foregoing attributes (crushing and force lines) on the rocks as well as the co-association of anvils and hammerstones with clusters of this modified, thermally altered rock.

Table 9: Summary Weight Statistics for Modified Fire-broken Rock

	Levels				
	1	2	3	None	Totals
N	1	19	682	12	714
Min.		0.9	1.2	4.3	0.9
Max.		94.3	374.6	91.1	374.6
Mean	18.3	22.8	30.9	21.0	30.5
S.Dev.		21.7	29.5	23.4	29.3

Modified Flakes and Shatter

This category includes objects that exhibit edge damage that may be attributable to use or intentional edge modification. Damage can range from light to heavy edge wear, indicated by edge rounding or dulling; edge nicking, suggesting some type of edge damage related to use; or continuous overlapping retouch less than 1.5 mm in maximum height; specimens with scars greater than 1.5 mm are included in the scraper category. Table 10 shows the distribution for all modified flakes and shatter by raw materials and Figure 45 compares size distributions for modified and unmodified flakes for level 3, where sample sizes are adequate for comparison. For this figure, all flake categories (bifacial, core, and bipolar) were grouped. Shatter was not included in order to maintain comparability in debitage types. A Kolmogorov-Smirnov test, which compares the differences in two cumulative distributions, yields a maximum difference

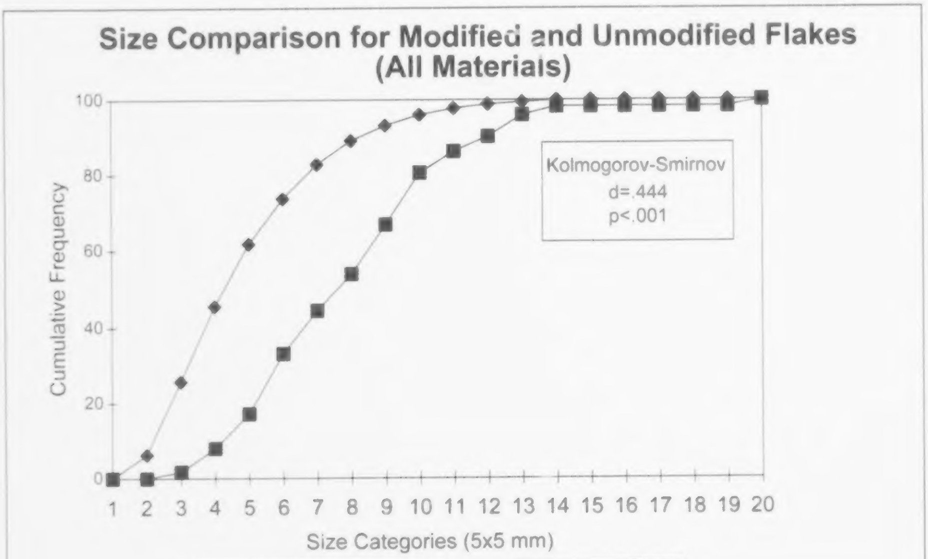


Figure 45: Modified and Unmodified Flake Comparisons

($Dmax_{obs}$) of 0.444 ($p<.001$). The minimum difference at .001 to reject Ho (i.e., no difference between the two samples) with sample sizes of 2,230 and 52 is 0.274 (Shennan 1988:55-61). Modified flakes tend, therefore, to be larger than unmodified. This seems intuitively obvious because larger pieces would likely be preferred for use or modification while the unmodified sample contains large numbers of very small flakes related to the reduction process. The same trend is, of course, evident in mean weights (unmodified 3.7, s. dev.: 6.8; modified 11.6, s. dev.: 15.2). A similar pattern has been observed at another subarctic site in the northern Yukon (Le Blanc 1984) and at a Palaeoeskimo site on the Arctic Coastal Plain on Cape Bathurst Peninsula (Le Blanc 1994b).

Table 10: Sizes and Raw Materials for Modified Flakes and Shatter

			Size Categories (5x5 mm)												
Level	Type	Material	3	4	5	6	7	8	9	10	11	12	13	14	20	Totals
2	Bif.	Quartzite				1										1
		V. quartzite					2									2
	Core	Quartzite							1							1
		Chert		2												2
		S.siltstone								1						1
		Obsidian														
	Shatter	Quartzite			1											1
3	Bifacial	Quartzite					1	1	3	1						6
		V. quartzite				1			1							2
		Chert				1										1
		Obsidian						1								1
	Core	Quartzite		1	2	2	1	1	2	6	3	2	2	1	1	24
		V. quartzite				2										2
		Quartz						1								1
		Chert	1	2	2	1	3	2								11
		Siltstone											1			1
	Shatter	Quartzite	1	1	2	1	1	4	1	1				1		13
		V. quartzite			1	4		1								6
		Chert	2	5	2											9
		S. siltstone				1										1
	Bipolar	Chert				1										1
		S. siltstone			1											1
		Jasper							1							1
Totals			4	11	11	15	8	11	9	9	3	2	3	2	1	89

Modified Cobble Spalls

Cobble spalls that exhibit edge rounding or wear, or, minor intentional retouch are included in this category. Table 11 presents a summary distribution of weights and Figure 46 shows the cumulative distributions for size categories.

Edge wear was subjectively evaluated as light (just perceptible edge rounding; visible at 10X or to touch), moderate (edge definitely dulled; visible to naked eye).

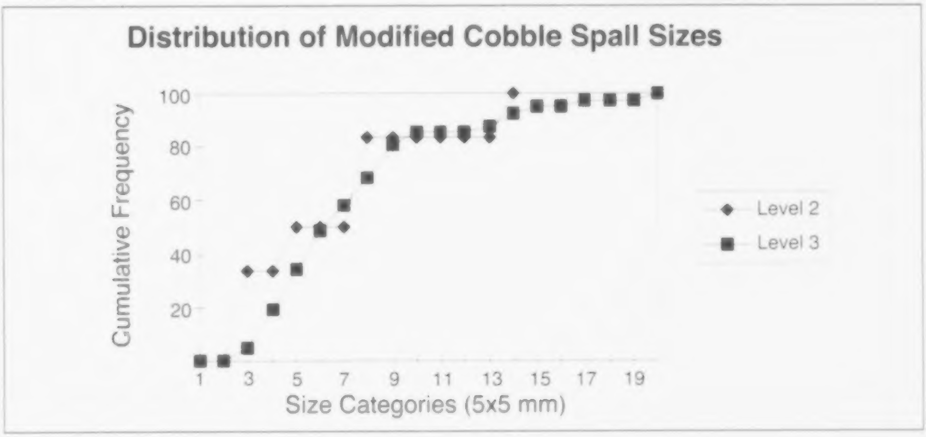


Figure 46: Size Distribution of Complete Modified Spalls

Table 11: Summary of Weight Statistics for Modified Cobble Spalls

		Spall Type		
Level	**Weight**	**Complete**	**Fragments**	**Totals**
2	Count	6		6
	Min.	33.4		33.4
	Max.	289.0		289.0
	Mean	127.3		127.3
	S.Dev.	93.2		93.2
3	Count	40	13	53
	Min.	25.6	18.4	18.4
	Max.	328.3	349.4	349.4
	Mean	109.6	105.6	106.6
	S.Dev.	78.7	89.5	80.3
Totals	Count	46	13	59
	Min.	25.6	18.4	18.4
	Max.	328.3	349.4	349.4
	Mean	109.6	105.6	108.7
	S.Dev.	79.8	89.5	81.3

and heavy (pronounced edge dulling with polish visible to naked eye). As wear often varied along edges, combinations were also recorded (e.g., moderate/heavy). Using the foregoing scheme, all of the level 2 examples were classified as moderate.

The level 3 wear distribution is as follows: light/moderate (n=2); moderate (n=24), moderate/heavy (n=9), and heavy (n=3). Two level 3 specimens exhibited some retouch, and one specimen appeared to be completely rolled or abraded. Although the latter example was clearly a cobble spall, the degree of overall abrasion suggests it must have a more complex taphonomic history than the other spalls from the site. Indeed, the degree of rolling suggests it was picked up from an active cobble beach; perhaps it was culturally produced on the beach, left there for a considerable length of time, then transported to the site.

Abraders

Three specimens exhibit abrasion that may suggest use for some type of grinding function. All are quartzite and from level 3. Two are fragmentary specimens. The larger of the abraders has a flat, slightly concave surface that is worn very smooth, suggesting use as a grinding tablet (#4642: l. 42.3; w. 35.0; t. 22.3; wt. 32.4). The second has one well-worn, slightly concave surface (#8256: l. 35.1; w. 31.0; t. 22.6; wt. 33.4). The third specimen, which may have been burnt, consists of a rather thick cobble spall (#3352: l 75.8; w. 52.8; t.22.3; wt. 173.6) with fairly heavy abrasion evident on a dorsal flake scar surface, and on approximately 75% of the ventral surface.

Anvils

Anvils consist of waterworn cobbles that have crushed areas on flat, or slightly curved surfaces that result from the damage sustained indirectly from blows delivered to objects placed upon them, or directly as a result of misplaced blows. Anvils were most likely used as supports for bipolar reduction of pebbles and cobbles and they likely played a role in the production of modified fire-broken rock, as described earlier. Anvils may have also been used in conjunction with hammerstones to smash fresh bone for marrow extraction, to prepare it for making bone soup, or, if the bone is finely fragmented, to produce bone grease. The fragmentary nature of most of the faunal material may suggest that one or a combination of these activities was being done. In this latter case, the hammer would periodically make direct contact with the anvil surface causing the characteristic crushing/dimpling of the surface.

Anvils occur as single used tools (n=6), or as multi-use items. The latter group includes anvil cores (n=4), anvil/hammerstones (n=9), and anvil/hammerstones/cores (n=2). Anvil weights range from 240.1 to 2,610.0 g; the mean is 726.5, and the standard deviation is 579.6.

All specimens were found in level 3, and without exception, they were rather minimally used, thus suggesting a rather expedient life-history for all of these implements. This contrasts with examples I have seen in other subarctic sites where,

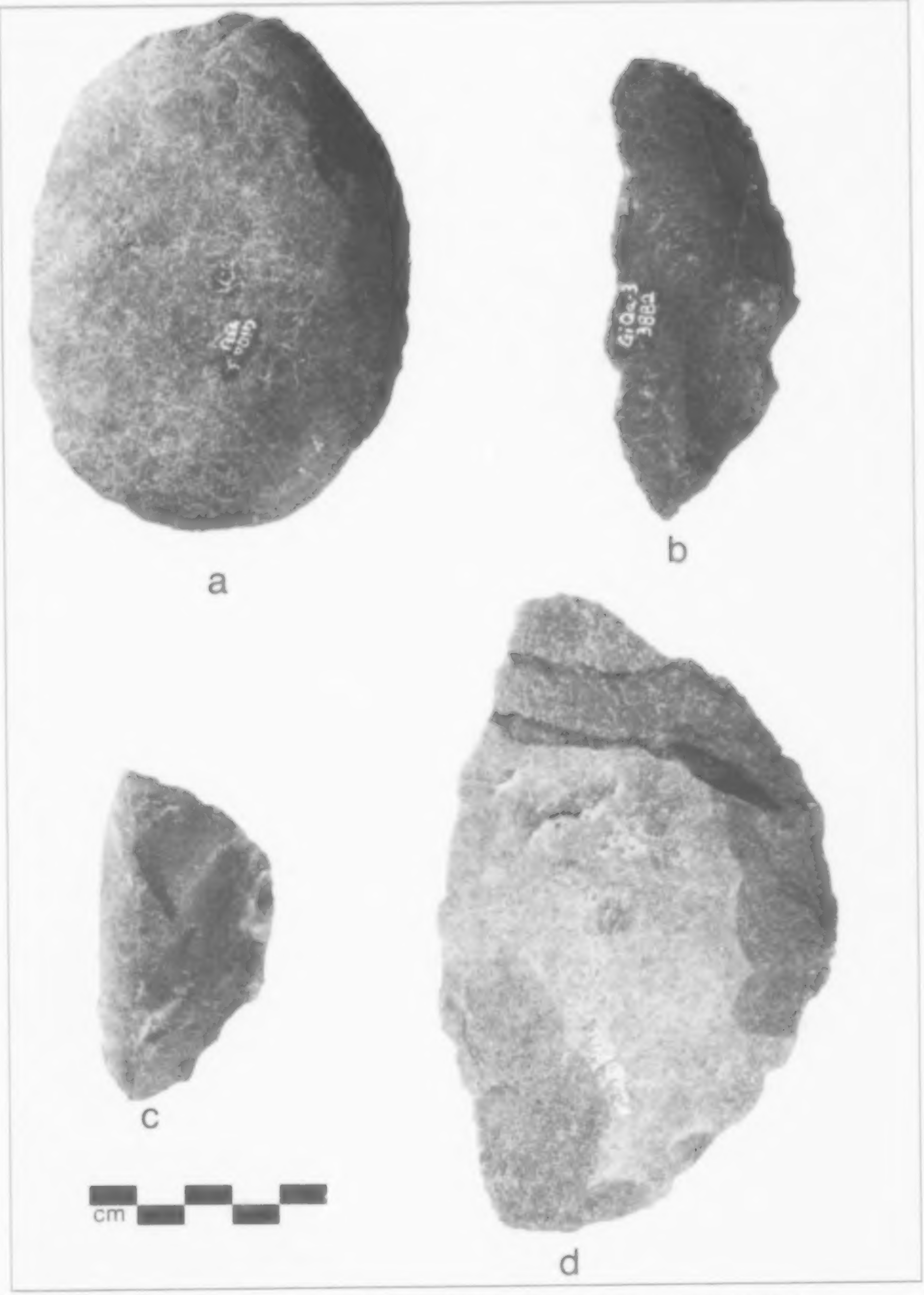


Figure 47: Modified Cobble Spalls and Preform: (a) 4373, (b) Preform, 3883; (c) 3317; (d) 8983. All from level 3

in one instance, the opposing surfaces of an anvil were deeply concave as a result of long-term use, very likely to process bone in the manner noted above (Le Blanc 1984: Plate 36). I have also observed the use of an anvil to pound dried caribou meat (or "dry-meat"). In this case, an Old Crow elder used a thick, flat cobble as the anvil, and the flat (pole) end of a small hatchet as the hammer. Interestingly, during the process of pounding the meat (lubricated with copious amounts of Crisco liquid shortening), there was little contact of the hatchet with the anvil surface, as the meat cushioned blows; moreover, there was little force necessary to achieve the desired result. There was some wear on the anvil surface, but given the length of use (several years) it was minimal. I suspect that bone-breaking for soup preparation would result in more intensive damage over the long-term. Moreover, different uses (core reduction, bone-breaking, pemmican making), may have required different anvils, most of which would have remained on-site as site furniture.

Bifaces

This category includes projectile points (n=9), implements (n=3) and preforms (n=3). Since there are so few tools in the collection, and bifacial tools figure so prominently in discussions of chronology and affiliation, I shall describe these specimens individually.

Projectile Points

Included here are five complete and four broken examples; Table 12 summarizes measurements.

Side-notched. Five examples are included here. The first (Figure 48a) is rather thick, has a slightly convex base, excurvate blade edges and a lenticular cross-section. The proximal half of the blade edges and the notches are dulled or ground. The edges of the blade are twisted along the longitudinal axis, and they are also rather irregularly finished, with small spurs or serrations, especially on the proximal half; the distal blade edges are still fairly sharp. This point appears most comparable to Late Taltheilei notched specimens illustrated by Gordon (1996: Fig. 4.4) and Noble (1971: Fig. 14d).

A second specimen (Figure 48c) has two pairs of weakly expressed side-notches. The initial pair of notches is located just above the convex, ground base. These are flaked from opposite surfaces and are lightly ground. The second pair of notches is just distal to the first; the notches are flaked like the former, but are not ground. The edges of the blade distal to the last pair of notches are excurvate and worn. Overall, the flaking is rather poor, although this may be a reflection of the material quality. Deep flake scars on the ventral face on the right side suggest the use of hard hammer percussion during an earlier stage of production; indeed the biface may well be a preform. A specimen similar to the one described here was found in a test pit during a historic resources impact assessment of an area just west of the Slump site (W. Kowal pers. comm., 1995).

The third example (Figure 48f) is made on a flake blank by edge trimming; there is no facial thinning. It has a plano-convex cross section, blades edges that are lightly ground on the proximal third, and a convex, unground base. The latter still retains a platform remnant from the original flake blank and the ventral face of the point still shows the bulbar area. The size and morphology of this point suggests a Late Prehistoric Plains side-notched.

The last complete example (Figure 48e) is weakly notched, but is completely flaked over both faces. The straight blade edges are sharp and overall flaking is excellent, especially given the nature of the quartzite material. The base consists of a ridge platform remnant, and there is evidence of a bulb on the ventral face; these features suggest the original blank may have been a bipolar flake. Given the small size, this too may be a late Plains-type of arrowhead.

Finally, a basal section of a side-notched point (Figure 48d) has a slightly concave base and fairly thin, lenticular cross-section; the base and notches are well-ground. Though too incomplete for reliable comparison, this specimen does have some parallels with the notch configuration on a Late Taltheilei, side-notched point shown by Gordon (1996: Fig. 4.5, KjNb-7: 15-12).

Stemmed. The single stemmed point (Figure 48b) is made on a flake blank that was shaped solely by edge trimming; there is no facial flaking. The base represents the platform of the original flake blank, and the point curves ventrally in the longitudinal axis, reflecting the configuration of the flake blank. The blade is thick and triangular; the proximal half of the left edge is moderately worn but the remaining edges are sharp or only slightly dulled. The stem is broad and the edges are lightly worn. In general morphology, this specimen resembles points from Middle Taltheilei (Gordon 1996: Fig. 5.2, 5.4) sites in the Northwest Territories. There are some similarities with Early Taltheilei stemmed varieties as well (cf., Gordon 1996: 6.3).

Fragments. A thick, diamond sectioned, stemmed specimen (Figure 48i), which is broken distally, is made of rather poor material with numerous poorly fused inclusions, accounting no doubt for the rather poor flaking. The blade edges are moderately to heavily ground, as are the edges of the stem and the straight base. A blade section (Figure 48g) with a plano-convex cross section exhibits complete facial flaking. A raised or abandoned plateau-like area near the proximal break suggests the point broke when an attempt was made to thin the dorsal face by removing the plateau. The edges of the specimen are sharp, but serrated, suggesting that they were not finished by edge trimming. The last fragmentary example is a tip section with a thin lenticular cross section (Figure 48).

Other Biface Implements

Both of the biface implements were found in level 2 and they are made of chert. The first (Figure 48j) is a small well-made, rod-like specimen with parallel edges and a thin lenticular cross section (l. 30.1; w. 7.9 mm; t. 3.8 mm; wt. 1.1 g). One end appears unfinished or partially broken, while the other is triangular in plan view. The edges adjacent to the latter end are heavily ground and this continues toward the other end, although the edge dulling becomes less pronounced. In overall configuration, this object resembles what would usually be considered a drill, but the dulling on the edges suggest some other type of function, perhaps as a small knife.

The second chert biface (l. 45.6 mm; w. 32.3 mm; t. 8.2 mm; wt. 12.8 g) is made on a flake and has a lenticular cross section (Figure 48k). It has invasive, flat flaking over about 50% of the ventral face, while the dorsal is about 30% flaked, the remainder being cortex covered; this facial flaking has trimmed away the platform remnant. The edges are moderately worn.

The last biface implement is from level 3 and is made of quartzite. It appears to have broken during production of a larger tool, but was then recycled (l. 72.3 mm; w 37.8 mm; t. 14.0 mm; wt. 36.0 g). It has a semi-lunar outline with a plano-convex cross section. There is flat invasive flaking that originates from the straight broken edge, suggesting a change in reduction strategy after the break. The straight edge has some light wear. The convex edge is sinuous, but has sections of moderate to heavy wear.

Table 12: Summary Statistics for Projectile Points

Cat. No.	Cond.[a]	Level	Material	Length	Width	Thick.	Weight	Fig. Ref.
1810	C	3	Quartzite	42.4	23.5	8.5	7.7	48b
3807	C	3	Quartzite	44.2	24.0	8.3	8.3	48a
6090	C	3	Chert	43.8	22.8	7.5	8.6	48c
3399	C	3	Quartzite	19.0	9.9	3.9	0.7	48e
2143	C	2	Quartzite	16.4	12.8	2.8	0.5	48f
2171	B	3	V. quartzite	24.6	17.6	10.4	4.6	48i
5643	B	3	Quartzite	13.8	21.2	6.3	1.9	48d
6771	B	2	Sil. siltstone	22.6	15.9	4.3	1.0	48g
2885	B	3	Sil. siltstone	14.7	12.4	4.1	0.6	48h

a. C=complete; B=broken

Preforms

A large bifacially flaked quartzite object (l. 139.4 mm; w. 88.0 mm; t. 32.7 mm; wt. 423.5 g) was found on the bluff face in front of the site. About 30% of the dorsal face is flaked, the rest is cortex; the flake scars are fairly deep. The ventral face has less invasive flaking, but no cortex, suggesting the object was made on a large cobble spall. Although classed as a preform, this specimen may have been a bifacial core. A second possible quartzite preform (Figure 47b; l. 101.3 mm; w. 49.1 mm; t. 29.9 mm; wt. 114.7 g),

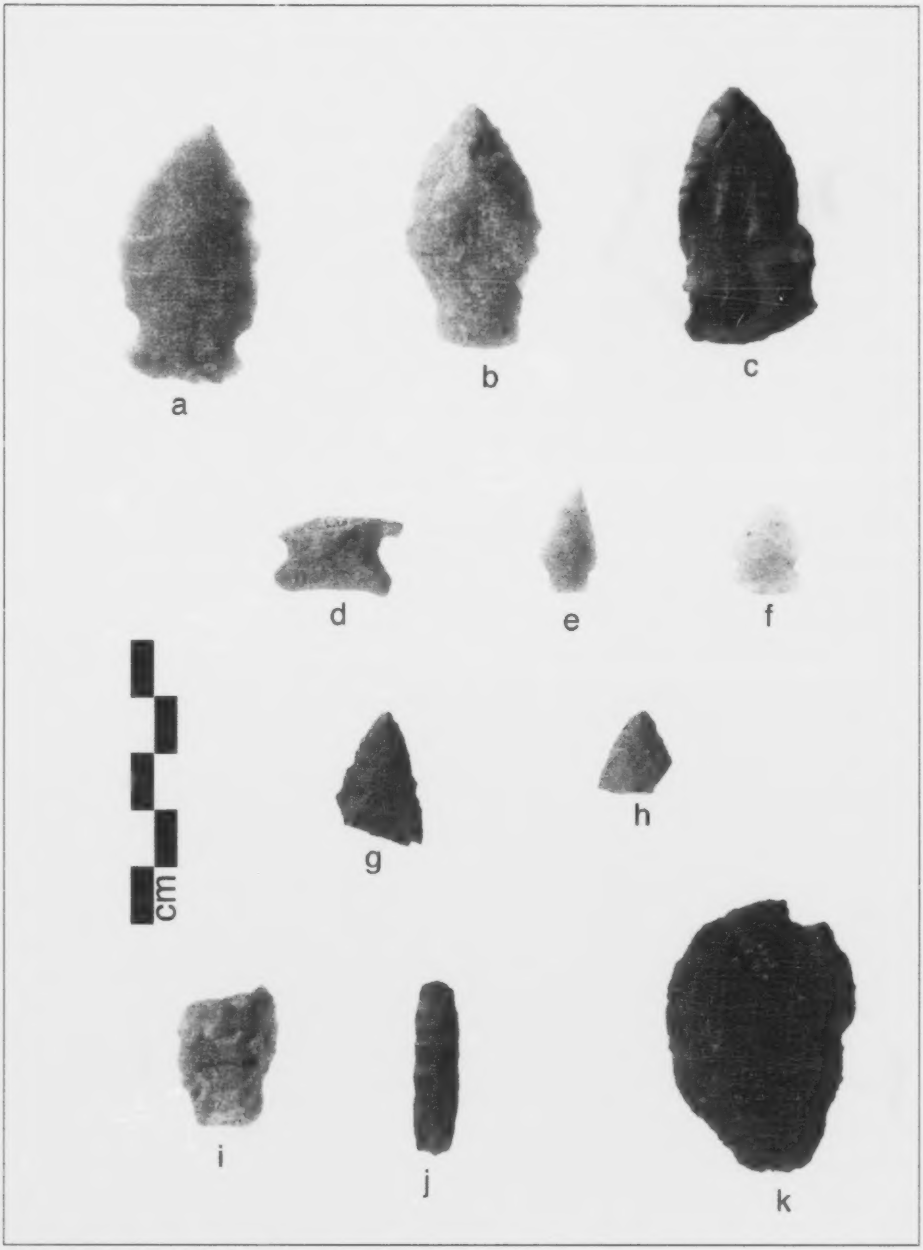


Figure 48: Projectile Points and Biface Implements: (a) 3807, (b) 1810, (c) 6090, (d) 5643, (e) 3399, (f) 2143, (g) 6771, (h) 2865, (i) 2171, (j) 8124, (k) 5299. Level 2: f-g, j-k; Level 3: a-e, h-i

has large fairly deep flake scars over about 60% of the left side of the dorsal face; the ventral face is flaked in a similar fashion. Edges are very sinuous and quite sharp. This specimen was found in a unit with 24 bifacial thinning flakes.The last example (#6525; l. 99.4 mm; w. 65.6 mm; t. 29.4 mm; wt. 155.9 g) is a thick quartzite specimen, 70% flaked over the dorsal face, and 100% on the ventral.

Choppers

Several tools made on spalls (n=4) or cobbles (n=4) have varying degrees of intentional retouch and wear. All are quartzite; one is from level 2 (#7257), the rest from the level 3.

Of the tools made on spalls, a large example (Figure 49d; l. 154.0; w. 133.0; t. 43.0; wt. 1,110.0 g) has dorsal flaking on the proximal, right, and distal margins; the latter edge exhibits fairly heavy crushing/wear. A second specimen (Figure 49c; l. 118.6; w. 77.6; t. 23.0; wt. 314.5 g) resembles a celt or axe blade. The dorsal face is cortex-covered, but the ventral face exhibits steep unifacial flaking along both edges, presumably to shape the tool; the same edges exhibit some light to moderate wear. The convex ends, which are not as heavily flaked as the other edges, are very heavily worn, but not crushed. The other two specimens have coarse bifacial flaking confined to sections of the edges.

At least some of the cobble tools bear an interesting resemblance to Old World pebble-tools. The first of these (Figure 50a; l. 97.3; w. 71.9; t. 39.0; wt. 397.2) consists of an ovoid cobble that was flaked on one end by a single blow to one side, followed by a second blow directed to the edge of the scar left by the first detached flake. The resulting edge is moderately to heavily worn by use. Crushed areas on opposite sides of the pebble indicate additional use as a hammerstone. A second ovoid example is morphologically similar to a classic Oldowan-like pebble-tool (Figure 50b; l. 86.4; w. 71.0; t. 38.5; wt. 314.3), with bifacial flaking along one end; the rest of the object is cortex-covered. The edge at the intersection of the scars is moderately worn, and there are small step flakes, extending from the two edge scars.

The most extensively modified pebble-tool (Figure 50d; l. 98.2; w. 82.0; t. 38.7; wt. 385.7 g) retains about 30% of cortex over both faces, the rest being flaked. Bifacial and unifacial edges are moderately to heavily worn. The final example is made on an approximately circular, lenticular cross-sectioned, spall-shaped waterworn cobble (Figure 50c; l. 96.8; w. 103.7; t. 30.4; wt. 344.0 g). It has unifacial flaking on about 40% of the circumference, creating a denticulate edge with moderate wear on some of the high points of the edge.

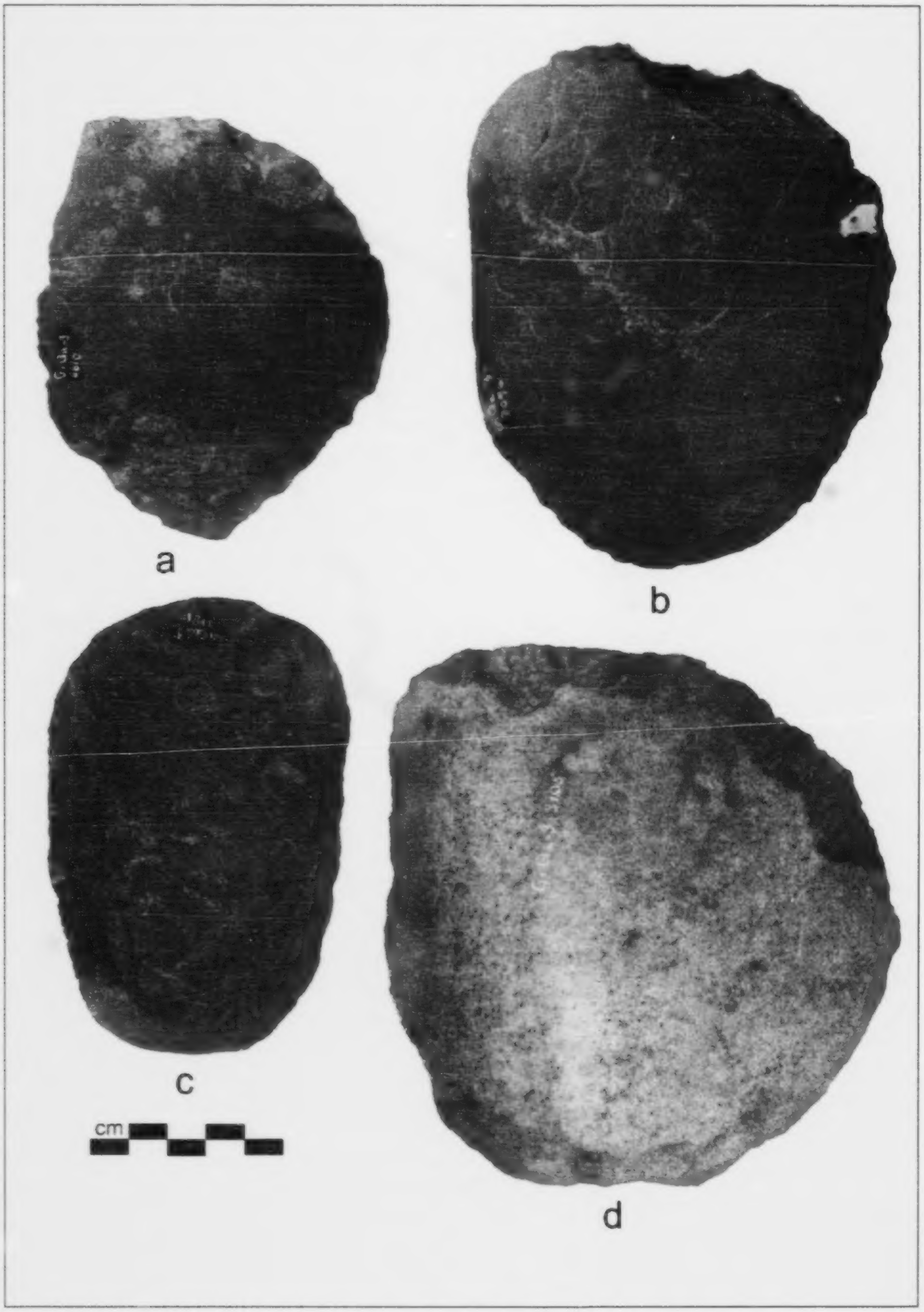


Figure 49: Choppers: (a) 6610, (b) 7096, (c) 7181, (d) 3105. All from Level 3

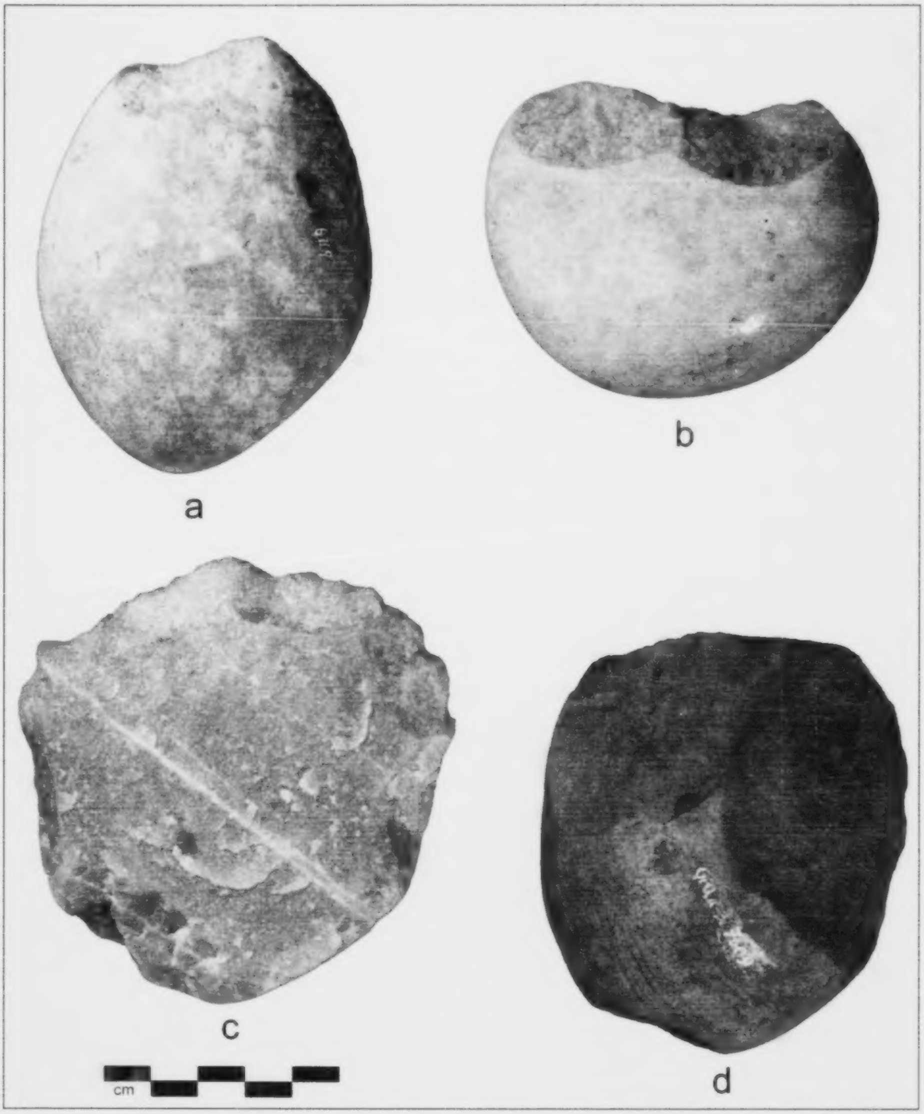


Figure 50: Choppers: (a) 6719, (b) 4462, (c) 7257, (d) 7609. Level 3: a-b, d; Level 2: c, level 2

Hammerstones

Fifty waterworn quartzite pebbles and cobbles have isolated points or small areas of crushing/battering on ends, (e.g., Figure 51b), sides (e.g., Figure 51a, d) or both (Figure 51c) that indicate use as some type of hammer. Of these, 24 are multi-use objects, including hammerstone/cores (n=13), hammerstone/anvils (n=9, Figure 51f) and hammerstone/anvil/cores (n=2; Figure 51e). These multi-use examples reflect the inter-relatedness of the various functions performed (e.g., a hammer used as an anvil, then a core, etc.). Nine of the specimens are pebble-sized, or less than 65 mm in diameter (mean wt. 92.8 g, s. dev.: 34.1, r. 25.1-132.5); the remainder are cobble-sized; i.e., 65-256 mm in maximum diameter (n=41, mean wt. 522.5, s. dev.: 479.1, r. 104.9-2,610.0 g).

Pièces Esquillées

Fifteen pièces esquillées were found that are classified as tools rather than by-products of bipolar core reduction. This was done following the discussion by Hayden (1980) about the differences and my own clarification Le Blanc (1992) of some of the issues concerning these objects that were raised by Shott (1989).

Table 13 displays the level, size, and raw material distributions for the sample. Weights average 6.4 g for the level 3 sample (s=6.2, r=0.9-18.8 g) and 3.0 g for the five specimens from level 2 (s=1.4, r=1.4-5.00). Following Binford and Quimby (1963), the majority of pièces esquillées have ridge-ridge (n=9) configurations (i.e., the primary and opposed secondary platforms are crushed ridges) (e.g., Figure 52f-g); the other types include area-ridge (n=4), ridge-point (n=1), and ridge-shattered (n=1). The secondary platform of the latter specimen was destroyed by rebound from the anvil.

Two examples have columnar fractures along an edge, extending from the primary to secondary platform. These facets are created as a by-product of the action that created the crushed, opposed margins (i.e., in this instance), not as an intentional burination. The object is literally sheared along one side and in so doing it removes a burin-like spall. However, such columnar facets should not be confused with the true burin technique, as some investigators have done, nor should they be taken as an indication of microblade facets on a small core. Columnar facets on pièces esquillées typically exhibit pronounced compression rings that reflect the strong forces associated with their detachment, and the resulting columnar flakes are often characterized by crushing points on the primary and secondary platforms. Microblade facets do not have the pronounced rings, and burin spalls usually have recognizable platform areas and very often have hinged or step terminations. In short, although columnar facets could be used in a planing fashion like true burin facets, they are not a function of the same technological process.

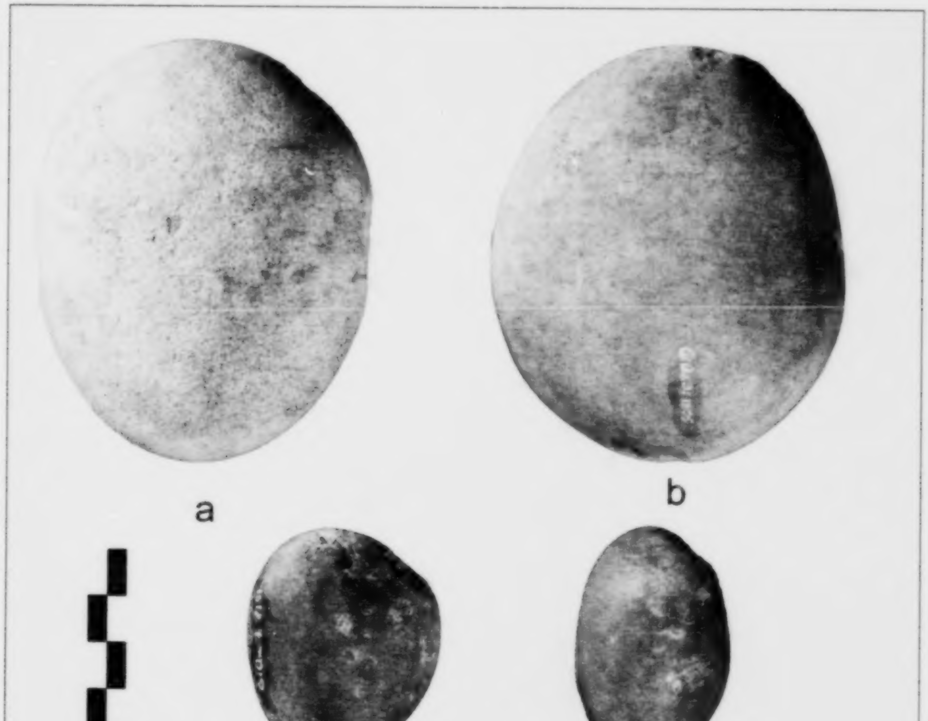


Figure 51: Hammerstones: (a) 2121, (b) 1805, (c) 8151, (d) 5352, (e) 3273, (f) 2114. All from Level 3

Table 13: Size and Material for Pièces Esquillées

		Size Category (5x5 mm)				
Level	**Material**	4	5	6	7	**Totals**
2	Vit. quartzite		1			1
	Chert		3			3
	Obsidian	1				1
Subtotals		1	4			5
3	Quartzite		1		2	3
	Vit. quartzite	2		1		3
	Chert		1	1		2
	Sil. siltstone		1	1		2
Subtotals		2	3	3	2	10
Totals		3	7	3	2	15

Scrapers

Thirty-eight specimens have been classified as scrapers, comprising end, side, combination end/side, spall and fragments (see Table 14 for the level distribution and a summary of basic attributes.

End. End-scrapers include those examples with the flaking edge perpendicular to the long axis of the scraper; i.e., usually on the distal margin of the original flake blank. Raw materials are almost equally divided between the major types (quartzite, n=6; vitreous quartzite, n=5; chert, n=5). The use of chert and vitreous quartzite may reflect the preferential qualities of the latter two materials in terms of edge toughness and regularity. Twelve end-scrapers are complete and four are fragmentary. All are made on flake blanks, and of those, three are made on bipolar flakes. Three specimens exhibit intentional invasive flaking of the dorsal face, indicating more effort in their manufacture. Most of the rest with dorsal flake scars have these because of the configuration of the core face before detachment; three others are combinations of flake scars (n=2) and cortex, or only cortex. One quartzite specimen (Figure 53e) has flake scar ridges on the dorsal face that are heavily worn, possibly as a result of abrasion caused by the hafting system. In terms of size, complete end-scrapers from level 3, where there is a reasonable sample, have mean lengths of 28.0 mm (s. dev.: 10.8, r. 16.5-44.7) and a mean weight of 9.8 g (s. dev=13.9, r=1.2-43.2). Edge angles, which are measured to the nearest 5°, average 70.6°, s. dev.: 8.8, r=60-80°).

Side. Side-scrapers have steeply retouched edges parallel to the long axis of the specimen, and tend to be larger than the end-scrapers, which is not too surprising in that constant resharpening would reduce the length of the latter, while narrowing the widths of the former. Chert is the most common material type (n=5), followed by quartzite (n=4), vitreous quartzite (n=3) and quartz (n=1). All are made on flake blanks, three of which are bipolar flakes. None has any dorsal flaking that could be

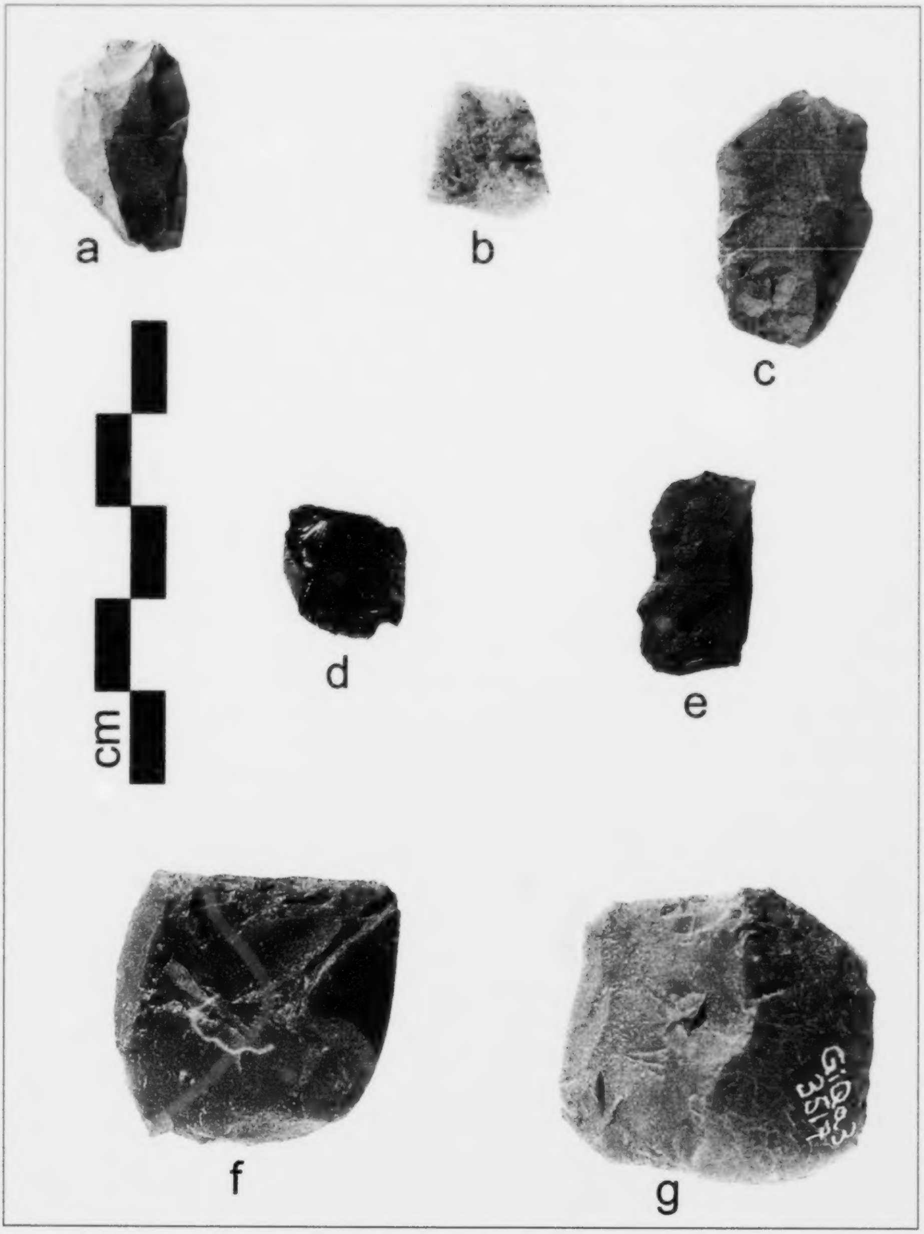

a
b
c
d
e
f
g
cm
GiQo-3
3517

Figure 52: Pièces Esquillées: (a) 7809; (b) 2944; (c) 4622; (d) 3757, obsidian; (e) 3140; (f) 3712; (g) 3517. Level 2: a, d-e; Level 3: b-c, f-g

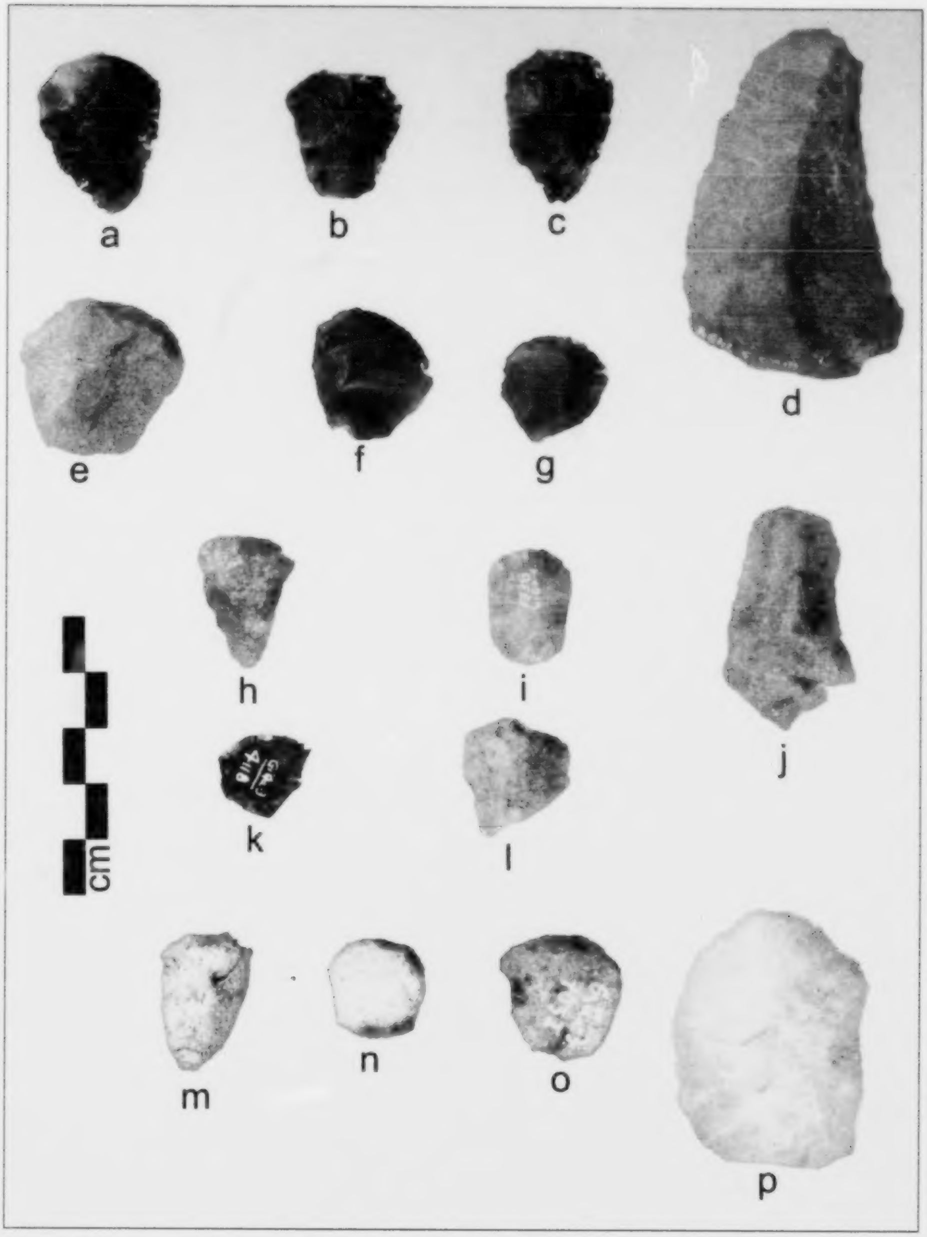

a
b
c
d
e
f
g
h
i
j
k
l
cm
m
n
o
p

Figure 53: Scrapers: (a) 8518, (b) 8377, (c) 5219, (d) 7154, (e) 7861, (f) 8600, (g) 6650, (h) 5877, (i) 5338, (j) 3772, (k) 4118, (l) 6603, (m) 8641, (n) 2104, (o) 7052, (p) 8855. Level 2: e-f, j, o; Level 3: a-d, g-i, k-n, p

considered as intentional shaping; i.e., the scars that exist are the result of the core configuration. Edges of retouched portions are moderately to heavily worn, and one specimen from level 2 has worn ridges between flake scars on the dorsal face, similar to an end-scraper described earlier. Sizes of a small group of five complete examples from level 3 are as follows: mean length, 41.6 mm; (s. dev.: 21.6, r=18.8-66.5); mean weights are 14.2 g (s. dev.: 12.9, r=1.8-30.7). Edge angles are virtually the same as the end-scrapers (mean=71°, s. dev.: 8.9, r=65-80°).

End/Side Combination

The four examples here include three of vitreous quartzite and one of chert. All are made on flake blanks, and two are intensively flaked over the dorsal face. On one of the latter (Figure 53i), the ventral face appears to have been sheared off by what appears to be a bipolar flake, thereby truncating the scraping edges.

Table 14: Summary of Scraper Attributes

Cat. No.	Level	Condition[a]	Material	Length	Width	Thick.	Edge Angle.	Weight	Figure
				End Scrapers					
7861	2	C	Quartzite	30.0	30.1	8.0	55	7.4	53e
8600	2	C	Chert	23.8	24.0	5.2	60	3.2	53f
4569	2	B	Vit. quartzite	17.4	13.7	3.1	40	0.8	
8518	3	C	Chert	30.5	22.9	7.6	80	5.5	53a
8855	3	C	Vit. quartzite	44.3	45.7	11.8	80	21.4	53p
5877	3	C	Vit. quartzite	24.9	18.0	10.3	75	4.0	53h
4118	3	C	Chert	16.5	16.5	4.9	70	1.2	53k
6650	3	C	Chert	17.0	15.0	4.4	60	2.2	53g
2104	3	C	Quartzite	17.3	18.3	7.3	80	3.0	53n
5219	3	C	Chert	29.5	20.4	7.3	60	4.7	52c
8641	3	C	Quartzite	27.2	17.1	7.8	60	3.1	53m
4297	3	C	Quartzite	44.7	45.5	5.5	70	43.2	
2101	3	B	Vit. quartzite	16.6	14.8	3.7	55	0.8	
8608	3	B	Vit. quartzite	21.6	24.0	4.7	80	2.6	
6603	3	B	Quartzite	22.7	19.9	8.5	75	4.1	53l
4001	3	C	Quartzite	41.1	35.4	16.3	80	22.4	
4538/4548	2	C	Chert	29.7	37.5	7.8	45	8.1	
6747	2	C	Chert	31.6	20.3	5.9	45	4.1	
3902	2	B	Vit. quartzite	15.9	20.3	2.8	45	1.2	
7256	2	B	Chert	46.1	17.8	5.2	45	3.6	
5867	3	C	Quartzite	19.8	25.6	5.8	70	3.3	
5209	3	C	Chert	46.0	24.0	7.9	60	10.7	
3393	3	C	Quartzite	18.8	17.6	4.5	80	1.8	

Table 14: Summary of Scraper Attributes *(continued)*

Cat. No.	Level	Condition[a]	Material	Length	Width	Thick.	Edge Angle.	Weight	Figure
End Scrapers									
8642	3	C	Quartzite	56.7	34.5	14.9	80	30.7	
7454	3	C	Quartzite	66.5	42.5	10.5	65	24.7	53d
5127	3	B	Vit. quartzite	26.1	27.9	6.2	50	3.0	
6087	3	B	Quartz	53.6	20.4	12.6	75	15.3	
5687	3	B	Vit. quartzite	27.9	13.8	4.3	60	1.7	
6905	3	B	Chert	30.1	25.2	8.2	75	6.2	
End/Side Combinations									
7032	2	C	Vit. quartzite	23.3	23.3	4.4	50, 60[b]	2.2	53o
3772	2	C	Vit. quartzite	36.4	34.6	6.6	50, 60	5.6	53j
8377	3	C	Chert	26.4	21.7	8.0	50, 70	4.2	53b
5338	3	C	Vit. quartzite	21.9	15.6	4.3	65, 60	1.3	53i
Fragments									
8205	3	F	Quartzite					3.0	
6369	3	F	Quartzite					0.3	
8431	3	F	Sil. siltstone					0.4	

a. C=complete; B=broken; F=fragment

b. Side, End

Spall Scrapers

Two cobble spalls exhibit retouch that suggests more extensive modification for use as a scraping tool. Both are quartzite and from level 3. The first (#2505: l. 97.1; w. 64.3; t. 40.5; wt. 214.9) is rectangular in outline with ventral retouch along the narrow, straight distal margin; the edge is moderately worn.

The second spall scraper (Figure 47a: l. 112.7; w. 83.3; t. 21.2; wt. 266.4 g) has steep alternate retouch on the right and left margins. The right is dorsally flaked and approximately 20 mm high, with an angle of 75°; it is moderately worn. The left edge is flaked ventrally, but less regularly than the right; it is about 14 mm high, has an angle of 60°, and exhibits light to moderate wear.

Faunal Remains

The faunal remains discussed here pertain to the 1988-90 excavations. Faunal material was also found in the 1980 test operation on the lower bench, but the small same of 20 elements was not analyzed (level 2=6, level 3=8, N. Prov.=6). However, as only 20 fragments were found.

Analysis of the remains was accomplished in two stages. Bones from 1988 (n=1,049) were analyzed by Nagy (n.d.) then a graduate student at the University of Alberta. Bones from the 1989-90 seasons (n=3,840) were identified by undergraduate volunteers under the supervision of S. Harpham, Archaeology Technician, Department of Anthropology, who is in charge of developing and curating the zooarchaeological collections. Figure 54-55 show the frequency distribution of the faunal sample across the excavated units.

Summary

Tables 15 and 16 show frequency summaries for the 1988 and 1989-90 collections. Despite the comparatively large sample of bones, the entire collection could be easily contained in two cardboard file boxes (i.e., approximately 0.06 m3), indicating a fairly high degree of fragmentation and/or deterioration[7]. This is revealed in quantitative terms in Table 16: 1,033 (26.9%) of the bones were not even identifiable to class; a further 1,621 (42.2%) could only be identified to class (mammal, bird, fish) level. Species identifications accounted for only 366 bones (9.2%). Consequently, the counts for Minimum Number of Individuals were quite low: 16 mammals (lev. 1=4, lev. 2=5, lev. 3=7) and the same number of fish (lev. 1=2, lev. 2=11, lev. 3=2). The MNI for mammals includes only small to medium-sized animals, including beaver, snowshoe hare and woodchuck. Fish include burbot, lake trout, northern pike, walleye, and some species of whitefish and sucker. All identified species are currently represented in the Lesser Slave Lake region fauna.

The high degree of fragmentation derives from a variety of potential sources. Certainly, cultural factors associated with processing bones for bone grease could be one of the main ones. There is ethnographic and archaeological information regarding the procedure. Leechman (1951), for example, observed the process in the northern Yukon village of Old Crow. There Vuntut Gwitchin people used the pole end of axes to fragment the bone into pieces "as big as finger nails" (ibid.), then extracted the fats by boiling the resulting material in water then skimming off the resulting grease. A similar process was described by Wallis and Wallis (1956:65) who cite an ethnohistoric source about the technique for the Micmac in Nova Scotia. Archaeological references also exist. Delpech and Regaud (1974) reported on ethnoarchaeological work where they observed Nunamiut of Anaktuvuk Pass making bone grease. They then used this information as the basis for interpretation of bone grease production for features composed of highly fragmented bone from an Upper Palaeolithic site in southwest France. Elsewhere, Dyck (1977) has described fragmented bone deposits for a Plains site in Saskatchewan, and I have recovered concentrations of the highly fragmented bone in sites in central Newfoundland (Le Blanc 1973) and the northern Yukon (Le Blanc 1984).

Natural taphonomic factors also must have played a role in the fragmentation process. Lyman (1994) has described these at length. Among the possibilities are bioturbation (e.g., rodents and carnivores; micro-organisms in the sediment; tree roots), freeze-thaw cycles, and soil chemistry. The latter can have profound effects on organic substances in the boreal forest.

Table 15: NISP for 1988 Slump Site Faunal Assemblage

	Level 2		Level 3		Totals	
Taxon	NISP	% iden. (n=97)	NISP	% iden. (n=315)	NISP	% iden. (n=413)
MAMMAL						
Woodchuck			2	0.6	2	0.5
Artiodactyl	1	1.0	1	0.3	2	0.5
Dog or coyote			1	0.3	1	0.2
Small mammal						
Medium mammal	3	3.1	2	0.6	5	1.2
Large mammal	70	72.2	292	92.7	362	87.7
ID to class only	300	-	254	-	554	-
Class subtotals	374	-	552	-	926	-
BIRD						
Small	1	1.0			1	0.2
Medium	2	2.1	1	0.3	3	0.7
Class subtotals	3	-	1	-	4	-
FISH						
Burbot	3	3.1	1	0.3	4	1.0
Northern pike	1	1.0	7	2.2	8	1.9
Walleye	3	3.1	2	0.6	5	1.2
Coregonus (sp.)	14	13.4	6	1.9	20	4.8
ID to class only	24	-	12	-	36	-
Class subtotals	45	-	28	-	73	-
UNIDENT.	46	-		-	46	-
Totals	468	100.0	581	100.0	1049	99.9

Seasonality

Given the nature of the faunal collection, there is that can be concluded concerning seasonality. Most animals represented in the faunal sample would be available year-round. Fish, for example, could be taken by through-the-ice techniques in winter, and by lake-shore or open-water fishing during the rest of the year; all of the mammals are similarly available. Evidence of birds is present, but it cannot be determined if these were resident or migratory species. However, even if the latter had been found, it would be of dubious value to suggest a warm-season occupation, since so little identifiable bird bone was found, and the availability of other food, plus storage techniques well-known for the boreal forest could prolong occupation well beyond the availability of migratory birds.

Table 16: NISP and MNI for 1989-90 Slump Site Faunal Assemblage

	Level 1			Level 2			Level 3			Totals	
Taxon	**N**	**%**	**MNI**	**N**	**%**	**MNI**	**N**	**%**	**MNI**	**N**	**%**
MAMMAL											
Beaver				18	0.9	1	18	1.0	2	36	0.9
Snowshoe hare	11	37.9	4	44	2.3	4	20	1.1	4	75	2.7
Woodchuck							1	0.1	1	1	0.03
Ursus (sp.)							5	0.3		5	0.1
Artiodactyl	1	3.5					1	0.1		2	0.1
Canid							3	.2		3	0.1
Carnivore							1	0.1		1	0.03
Large carnivore							9	0.5		9	0.2
Small mammal				41	2.1		39	2.1		80	2.1
Medium mammal	7	24.1		115	5.9		438	23.6		560	14.6
Large mammal				58	3.0		44	2.4		102	2.7
ID to class only				127	6.5		467	25.1		594	15.5
BIRD											
Medium							1	0.1		1	0.03
ID to class bird/hare				89	4.6		54	2.9		143	3.7
FISH											
Burbot	1	3.5		31	1.6	2	14	0.8		46	1.2
Lake trout				65	3.3		16	0.9		81	2.1
Northern pike				41	2.1	5	9	0.5		50	1.3
Walleye				39	2.0	1	38	2.0	2	77	2.0
Coregonus (sp.)	1	3.5	1	27	1.4	2	20	1.1		48	1.3
Catostomus (sp.)	1	3.5	1	5	0.3	1	4	0.2		10	0.3
ID to class only	6	20.7		676	34.6		201	10.8		883	23.0
UNIDENT.	1	3.5		575	29.5		457	24.6		1033	26.9
Totals	29	100.2	6	1951	100.1	16	1860	100.5	9	3840	100.0

Bone Modifications

Table 17 presents a summary of modifications observed on the bones. Burning and/or calcination overwhelms other types of modification, as it accounts for 97.9% in level 2 and 80.2% in level 3. Burning could be attributed to cultural factors such as roasting of meat or disposal of bone in hearths. Post-occupation forest fires may have also altered some specimens. A few bones were recorded as being weathered, suggesting they lay on the surface for some time before becoming buried. Cut marks, suggesting butchering, were recorded on only three bones (0.5% of altered bones), which is likely a reflection of the small size of the fragments and the generally poor condition of the bones.

Table 17: Alteration on Faunal Material (1988-1990 Assemblage)

	Level 2		Level 3		No Prov.		Totals	
Alteration	N	%	N	%	N	%	N	%
Burnt	215	50.4	63	29.0			278	43.1
Burnt/calcined	203	47.5	111	51.2			314	48.7
Cut marks	2	0.5	1	0.5			3	0.5
Weathered	7	1.6	42	19.4	1	100.0	50	7.8
Totals	427	100.0	217	100.1	1	100.0	645	100.1

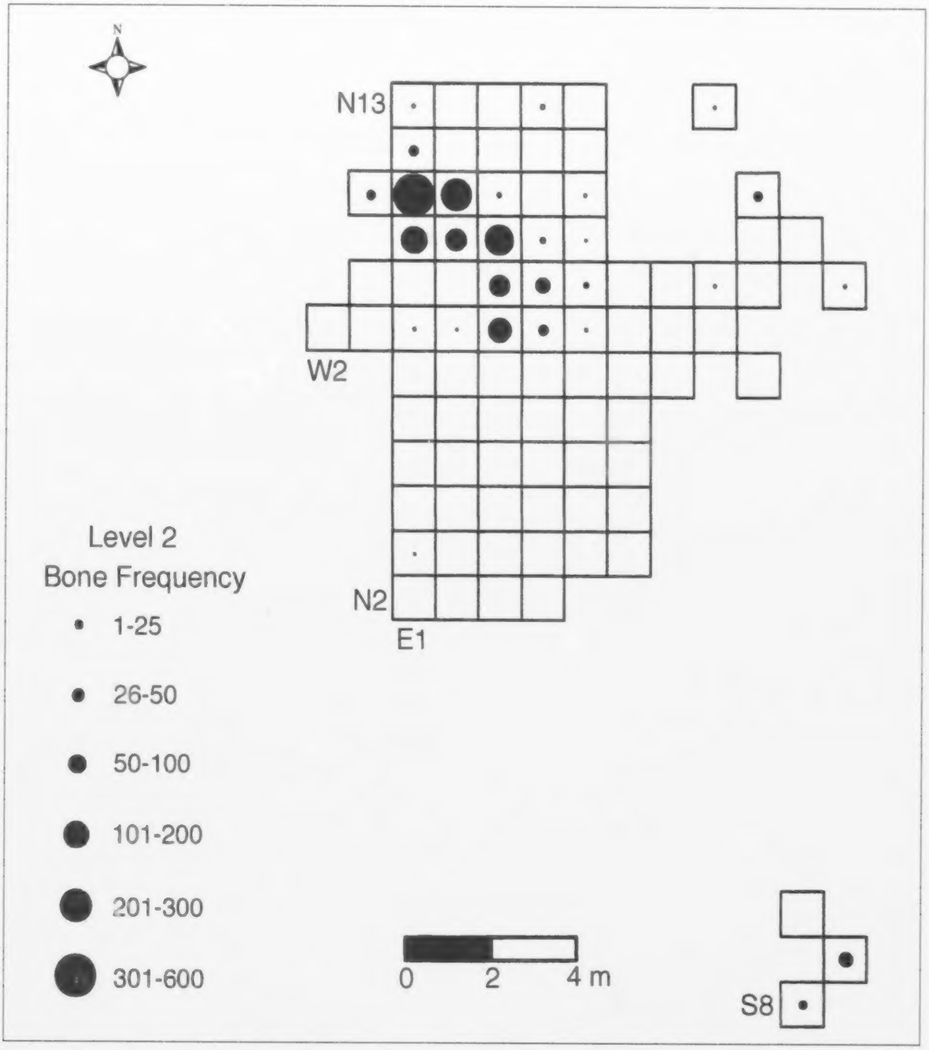

N
N13
W2
N2
E1
S8
Level 2
Bone Frequency
• 1-25
• 26-50
● 50-100
● 101-200
● 201-300
● 301-600
0
2
4 m

Figure 54: Distribution of Faunal Remains for Level 2

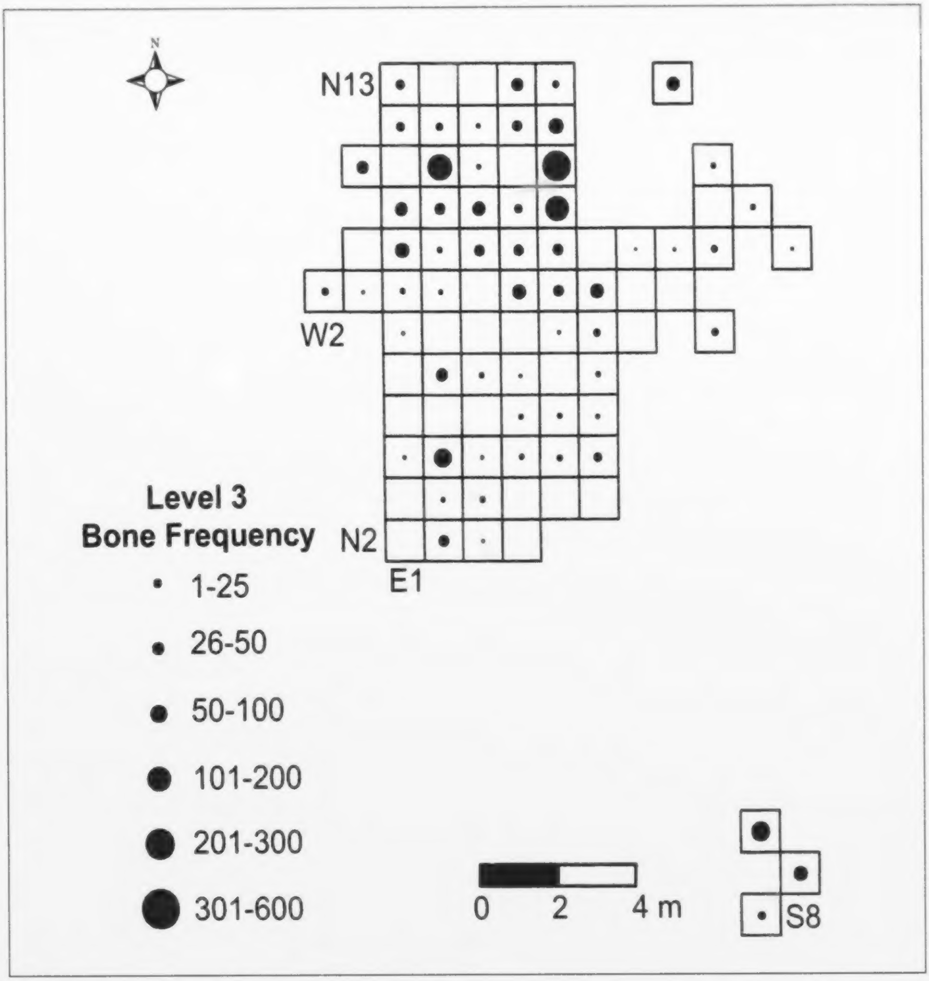


Figure 55: Distribution of Faunal Remains for Level 3

Chronology

Four samples of organic material from levels 2 (n=2) and 3 (n=2) were submitted for radiocarbon dating (Table 18), but results were somewhat problematic, as none are consistent within stratigraphic levels. The oldest date, which is from level 3, should probably be ignored as the "sample [weight was] well below the desirable minimums…[prompting the lab to recommend] caution…[as it] may well be inaccurate" (H. Melville, pers. comm., 1997). Indeed, the sample, which was based on a composite of tiny bone fragments, was too small to provide a measurement of isotopic fractionation. Sample BGS-1930 may represent a reasonable estimation for level 3 since it seems consistent with the range of Late Prehistoric Period types of projectile point recovered from the site. This determination only just overlaps that of BGS-1928 from level 2 at 2 sigma, or about 670 BP. The latter sample was recovered from a hearth area associated with burnt bone and fire-cracked rock, and is therefore likely to be fairly reliable. Because the overlap between this date and the former is minimal, there is a possibility of some temporal separation between levels, but likely not enough for any significant change in material culture. Diagnostic artifacts clearly support this view. The youngest date spans the terminal part of the Late Prehistoric Period and accords well with the presence of late Plains types of points.

Table 18: Radiocarbon Samples from the Slump Site

Lab No.	Material	Date BP[a]	δ13%	Calibrated 2 sigma range[b]
BGS-1928	Charcoal (9.0 g), lev. 2	603 ±80	-25.53	cal BP 672 (624, 615, 655) 504
BGS-1929	Charcoal (12.8 g, lev. 2	160±75	-25.97	cal BP 312 (267, 205, 143, 17.0*) 0*
BGS-1930	Charcoal (12.5 g), lev. 3	888±80	-23.70	cal BP 945 (781) 663
BGS-1931	Bone (121.5 g), lev. 3	2740±500		cal BP 4087 (2842, 2831, 2797) 1621

a.δ13 corrected; BGS-1931 too small for isotope correction

b.Calibrated using CALIB 4.1.2 programme (Stuiver et al. 1988; Stuiver and Reimer 1993)

c.0* negative age BP

Summary

Located on the shore of a large lake in the boreal forest, the Slump site provided its inhabitants with many advantages in terms of food resources such as fish, waterfowl, medium and large-sized game, various types of plants for food and medicinal purposes, as well as wood for building structures and a wide variety of implements, and finally, a local source of lithic raw material. The site also represents one of several dozen in the area extending from Shaw Point, about a kilometre to the west, to Cut Bank Point about six kilometres east. Such a density of human activity likely reflects the favourable location with respect to all of the foregoing resources, and the juxtaposition of the lake with the boreal forest to the north, south, and east, and a parkland environment extending to the west. The latter area likely provided excellent bison habitat, as indicated by comments of white pioneers to the area noted in Chapter 1. Aboriginal burning of forest areas likely contributed to the creation and maintenance of these parkland areas (cf., Lewis 1982), as is thought to be the case for the region around Grande Prairie (Soper 1941).

The refitting study suggests at least two pre-contact components represented by excavation levels 2 and 3. However, there were no significant differences between the two in terms of typology, technology, or time. It was seen reasonable to suggest therefore that the same cultural group reoccupied the site, and likely carried out the same range of activities.

Technological analysis of the assemblage indicates a variety of large cobble-based tools (anvils, hammerstones, choppers) and small flake-based implements (mainly scrapers and projectile points) produced using local raw materials. The coarse stone industry involved on-site reduction of quartzite cobble cores to produce flakes for use with no further shaping (i.e., edge-modified flakes), and as blanks for the production of scraping tools. Cobble spalls, which are quite common and could be used for a variety of cutting and scraping tasks, appear to have been made off-site. Anvils and hammerstones likely served for bipolar flaking, but were also likely used for production of other lithic items (modified fire-broken rock, see below), and may have been used to smash bone, possibly for the production of bone grease.

Analysis of the debitage with reference to major raw material types (chert, vitreous quartzite and quartzite) and reduction stage, indicates that the higher quality materials, such as cherts and vitreous quartzite, track one another closely, with most flakes relating to middle and late reduction stages. These results imply that tools and preforms of these materials were brought to the site, then completed on-site, and resharpened during use. Quartzite on the other hand, is well represented in the early stages of reduction, indicating on-site core reduction.

Although the latter suggests a quarry/workshop function for the site, the presence of features such as hearths and pits; faunal remains; profuse quantities of fire-cracked rock, several hundred of which were intentionally fractured, and transport and use of chert and vitreous quartzite implements imply a habitation area as well. Clearly, the Slump site must have fulfilled multiple roles in local settlement patterns.

A notable artifact category has been named, for want of a better term, modified fire-broken rock. Normally, fire-cracked or broken rock exhibits angular breakage that is a consequence of rapid change in temperature caused by immersion of fire-heated rocks in liquid for boiling purposes. The standard type of fire-cracked rock was abundant at the site (level 2, n=932, mean wt. 26.3 g; level 3, n=4267, mean wt. 29.7 g), but the intentionally fractured rock was also fairly common with some 714 pieces of it being recorded, most of it from level 3 (level 2, n=19, mean wt. 22.8; level 3, n=682, mean wt. 30.9).

As noted earlier, pieces of purposefully fractured fire-cracked rock have easily identifiable points of percussion and subtle force lines radiating from these points. All of them have a "sugary" texture, indicating thermal alteration, and they have about the same average weight as the normal fire-cracked rock. I suspect that the intentionally split and burned rocks were broken by means of bipolar smashing of pebbles and small cobbles on anvils, but for what purpose, is not yet evident. I do not believe that these artifacts were simply by-products of failed flaking episodes, because none had flake facets that would suggest they were core fragments. Our experimental work indicated no improvement over the use of unmodified pebbles and cobbles in boiling water, nor whether the rocks were broken before or after heating. A tentative explanation of pit-roasting of food could be suggested by the 149 pieces of MFBR that were found in a pit feature. Even here, however, I can see no reason why heated, but unsplit pebbles would not be just as effective. Whatever the ultimate explanation, there are two classes of fire-altered, coarse-grained rock at the Slump site, and in this respect, the site is unlike any other we found in the study area.

The radiocarbon dates, and the typological identifications of the projectile points indicate a rather late occupation. There are, nonetheless, indications of connections with the plains as suggested by points having similarities with Late Prehistoric Period notched varieties. There are also indications of influences from the Northwest Territories, as indicated by projectile points similar to Late Taltheilei Tradition specimens. I will return to the implications of wider areal relationships in Chapter Five.

CHAPTER 4

The Hidden Creek Site

The Hidden Creek site (GjPx-6) was discovered during foot survey of a section of the first lake terrace east of the east boundary of Hilliard's Bay Provincial Park. The terrace in this area is fairly flat and seldom more than 20 metres wide. Historic Grouard Trail winds along the terrace and provides fairly easy access to the lake edge. Unfortunately, construction of the trail has obliterated prehistoric archaeological remains along narrow segments of the terrace bench. At the Hidden Creek location, however, the terrace is fairly wide and the trail is located at the back of the bench, near the base of a higher terrace (Figure 56).

The trail intersects a small unnamed creek that has cut through the first terrace to the lake. The mouth of the creek is covered by over-hanging willows and is screened from view when approaching from the lake or along the beach (Figure 57). The terrace, which is 4.5 m above the (1980-82) beach, is heavily forested with a mixture of young to mature aspen. Ground cover is minimal, consisting mainly of very young aspen suckers and the odd small bush. The beach in front of the terrace has a narrow band (2 m) of sand, interspersed with concentrations of quartzite pebbles and cobbles. In 1980, the lake in front of the site was occupied by extensive weed beds that extended from 20 to more than 100 m offshore. In 1981 and again in 1982, the lake level dropped significantly and the weeds expanded to more than 250 m off-shore. Eventually, large mud flats were exposed in front of the site and access by boat became quite difficult until the mud-flats dried and the boat could be landed at the new shoreline.

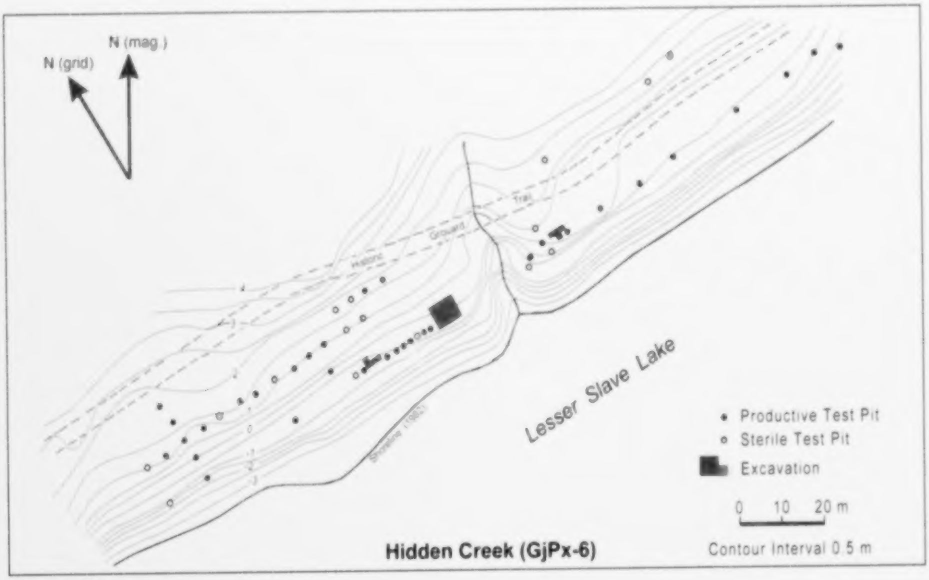


Figure 56: Map of Hidden Creek Site

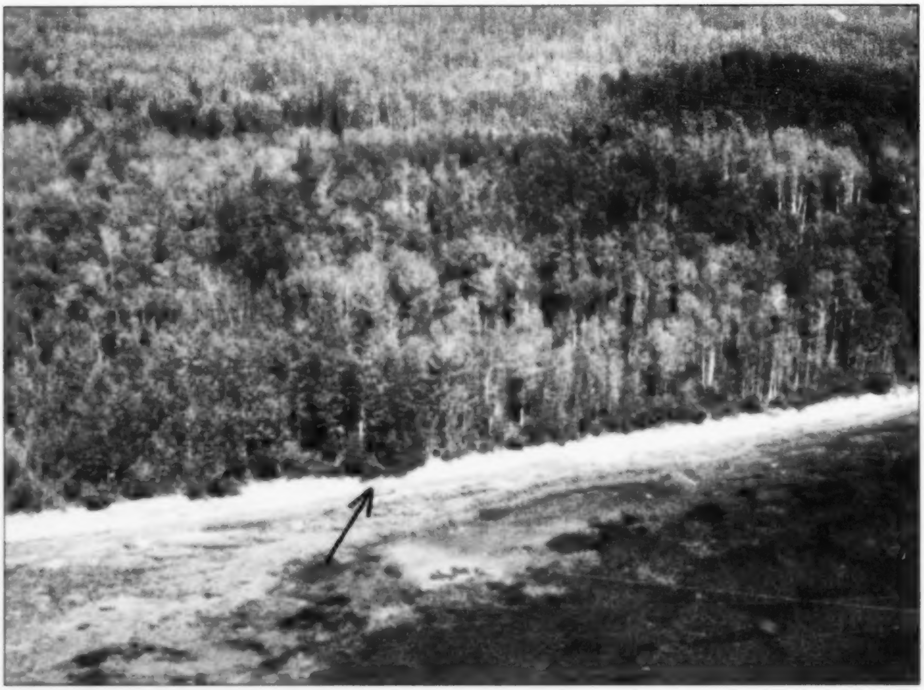


Figure 57: Aerial View of Hidden Creek Site, 1980. Mouth of the Creek is Indicated by the Arrow; Site is on 4.5 m Terrace behind Cobble Beach and Extends East-West along Lake to at least the Limits of the Plate

Initial shovel testing on the east and west sides of the creek indicated the presence of cultural material composed largely of fire-cracked rock and flakes. The density of fire-cracked rock and the undisturbed nature of the site was encouraging enough to undertake limited testing in 1980. For this purpose, a 1 m x 5 m trench was established on the terrace 3 m west of the creek gully and approximately 2 m north of the edge of the terrace overlooking the lake. Excavation by trowel proceeded in natural levels. As with the Slump site, the contact between layers is irregular and probably reflects the effects of bioturbation. Artifacts were piece-plotted with vertical control being maintained with reference to the ground surface adjacent to each unit; individual pieces of fire-cracked rock were not recorded unless they composed part of an identifiable feature. Faunal material was collected by level for each unit.

In 1981, the testing programme was expanded to include additional block excavations (24, 1x1 m units) surrounding the initial test trench and shovel testing to further delimit the site limits west and east of the creek along the terrace bench. Except for the addition of the use of line levels keyed to an arbitrary vertical control point, the excavation techniques remained the same as the previous season. The shovel testing established the western boundary of the site at 80 m west of datum; while further testing east of the creek disclosed the presence of cultural material some 30 m east of datum (datum is about 3 m west of the west edge of the top of the creek gully).

During the 1982 field season, additional testing was undertaken at two promising areas that were located during the previous field season. The first of these was 21-24 m west of datum. Five, 1x1 m units were excavated in an area where two test pits separated by 6 m had produced a dense cluster of fire-cracked rock, several flakes and core fragments, as well as historic period material, including one gunflint. These materials suggested the possibility of an early historic component, but subsequent test excavations revealed little additional material (14 flakes, four cores, one pebble, and four pieces of faunal material). Testing was therefore abandoned and redirected to the area east of the creek. Here, excavation centred on another shovel pit that produced a large number of flakes and quantities of fire-cracked rock. Four 1x1 m units were placed over this location and excavation revealed a hearth feature, surrounded by artifacts and fire-cracked rock. Although the hearth was completely excavated, time did not allow expansion of the excavation around the feature.

To complete the 1982 season, shovel testing was conducted farther to the east and a 0.5 m contour interval map was also produced. The testing extended approximately 85 m east of datum along the terrace but because of time constraints, it was not possible to define confidently the eastern border of the site. Cultural material was found only in test pits between the Grouard Trail and the edge of the terrace overlooking the lake. On the basis of topography and the nature of the distribution of material for the rest of the site, it is probably reasonable to assume that the occupation extends at least another 30 m along the lake. This narrow strip orientation is obviously a reflection of topographic control on suitable occupation area.

Stratigraphy

Like the Slump site, Hidden Creek was excavated in natural levels, consisting of the Ah (level 1), the Ae (level 2), and the B (level 3) horizons (Figure 58 and Figure 59). The leaf litter of level 1 varied from 3 to 15 cm in thickness. The second level consists of a dark brown to black loamy soil, 2.5 to 15 cm thick. Level 3 is quite variable ranging from a greyish sandy colour to a brown clayey sand. Like the Slump site, the clay component increased with depth, making excavation quite difficult with prolonged exposure of unit floors to the sun.

Features

Hearths

Two hearths were identified, one in the southwest portion of the block excavation west of the creek, the other approximately 20 m east of the creek, overlapping the east-west baseline. The first hearth is located in units S1W4 and S1W5, about 1.5 m from the edge of the terrace. It is situated in the upper few centimetres of level 2, immediately

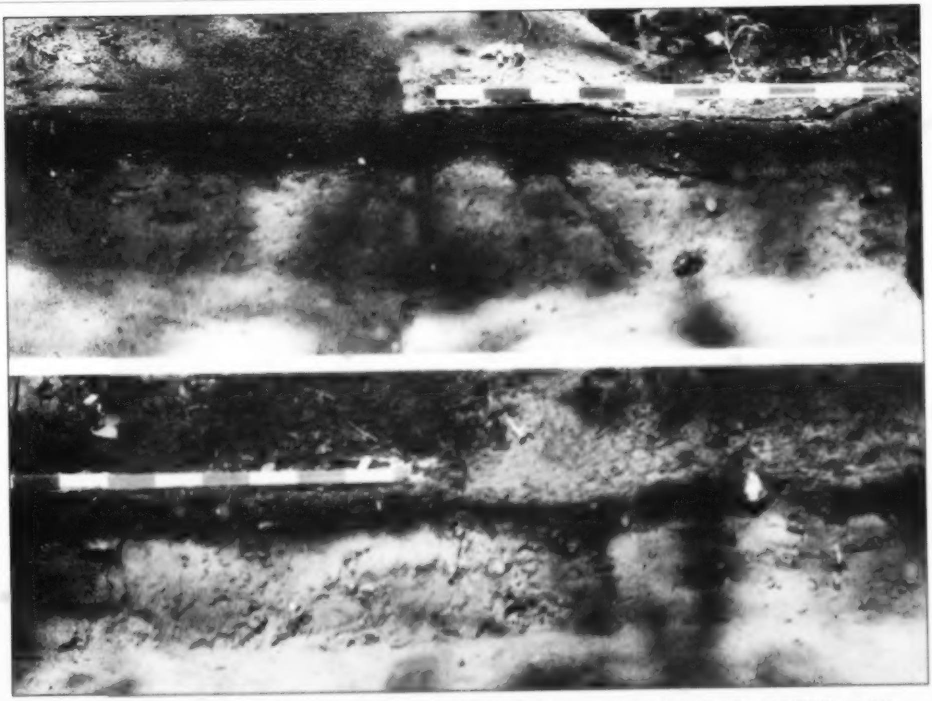


Figure 58: Top: Composite Profile of N3W1 (right) and N3W2; Bottom: Composite Profile of N3W3 (right) and N3W4

underlying level 1, and is marked by a distinctive deposit of greyish ash containing minute fragments of calcined bone and several (n=11) pieces of fire-cracked rock; the ash is thickest in the centre (7.5 cm) and feathers out towards the edges. The feature has an irregular outline with the long axis oriented northwest-southeast; it is 76 cm long and 47 cm wide (Figure 60). Artifacts contained in the feature 1 matrix include two refitted grey chert flakes and one quartzite anvil. The areas adjacent to the hearth, particularly to the south, west, and north have a general distribution of fire-cracked rock and artifacts; the latter are fairly concentrated to the north of the feature. The second hearth feature overlapped N1-2E29 and N1-2E30 in level 2; the larger portion was found in the East 29 units (Figure 61). The upper few millimetres of the feature is consists of a deposit of clean beach sand, which varied from 0.5 cm thick on the west side, to c. 3 cm on the northeast. The sand is underlain by a grey-white ash (max. thickness is 3 cm) containing calcined bone. When exposed, the feature was 100 cm along its long axis (NE-SW) and 74 cm at right angles. A considerable amount of fire-cracked rock was found immediately adjacent to the hearth, particularly in N1E29. A few tools, several pieces of debitage and about 100-200 grams of burned and unburned bone were found in the feature. Neither of the hearths had any indication of burned soil beneath them.

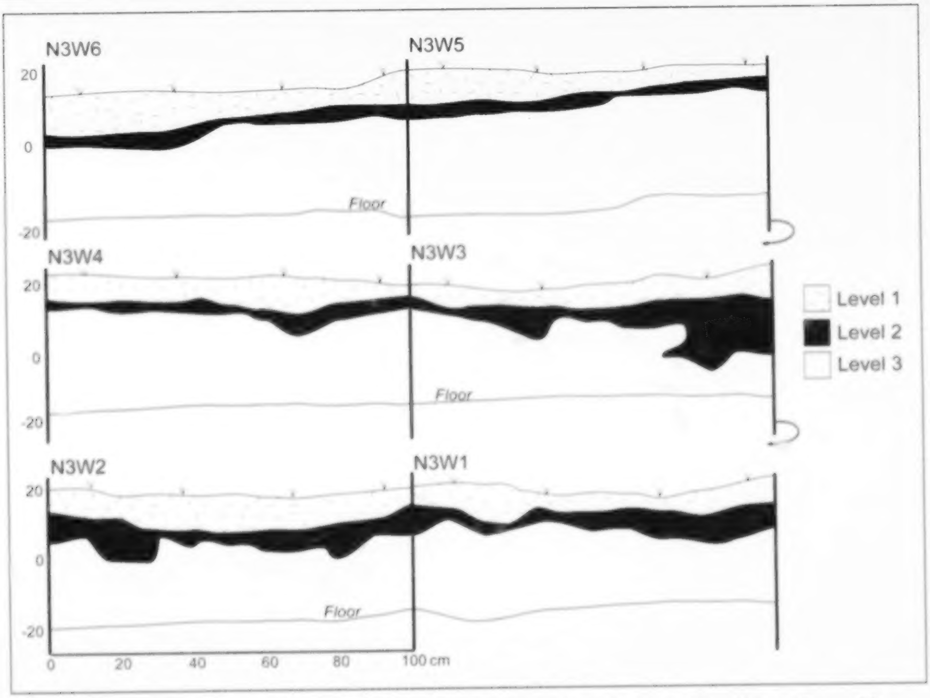


Figure 59: Composite Stratigraphic Profile. Bottom two Cover the same Profiles as the Walls in Figure 58

Rock Concentration

Surrounding the west hearth feature were several flat cobbles, 10 to 30 cm in diameter (Figure 63), including a tight cluster in the southeast corner of unit S1W6, approximately 0.5 m west of the hearth. The latter was composed of six flat, flagstone-like cobbles, none of which shows any indication of use, either as stationary anvil or cores, nor do they appear to be arranged in a pattern which would suggest the outline of some type of temporary structure. Nonetheless, their context indicates that they are indeed manuports.

Refitting Study

Figure 62 displays the refits for the Hidden Creek site. Numbers on the figure refers to different excavation levels. Figure 64 displays the range of refit lengths, and Table 19 displays summary statistics on within and between level refit. Information is not available on the types of refits (i.e., breakage versus production sequences) as was done for the Slump site, since this was not recorded during the refitting operation.

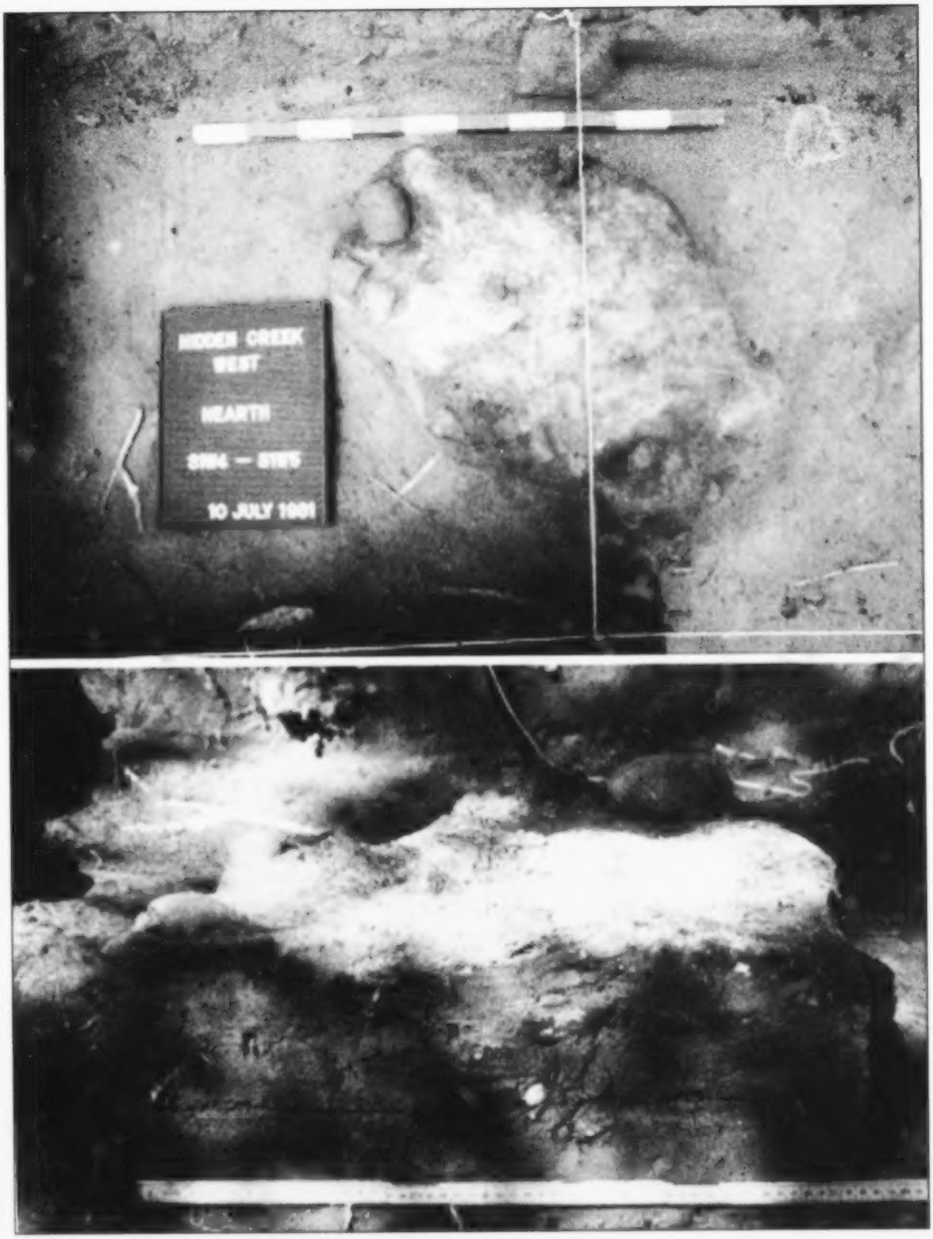

HIDDEN CREEK
WEST
HEARTH
S1114 — S1115
10 JULY 1981

Figure 60: Plan and Profile Views of Feature 1 Hearth

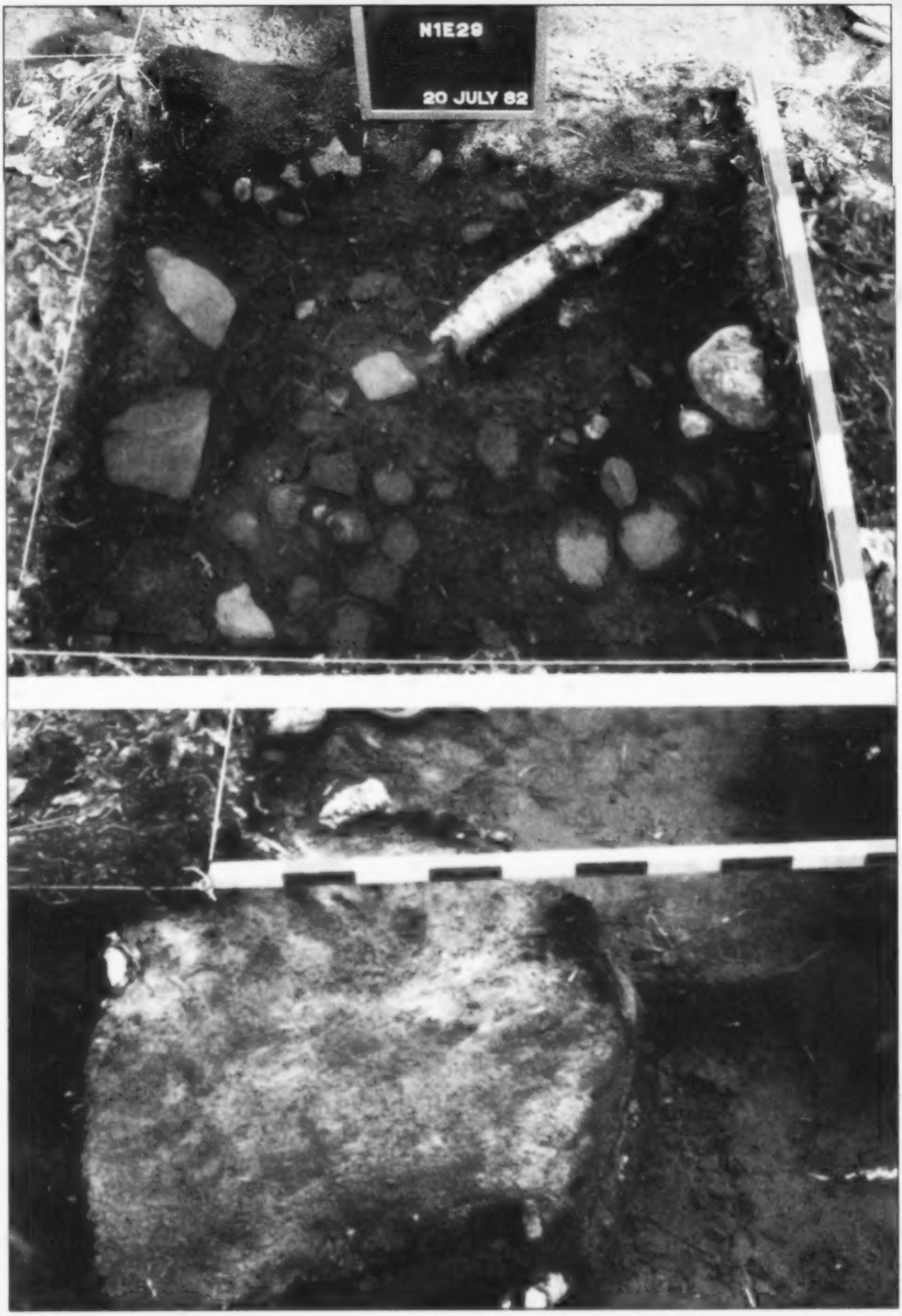

N1E29
20 JULY 82

Figure 61: Top, Fire–cracked Rock near Hearth. Bottom, Plan view of Hearth in N1–2E29 and N1–2E30

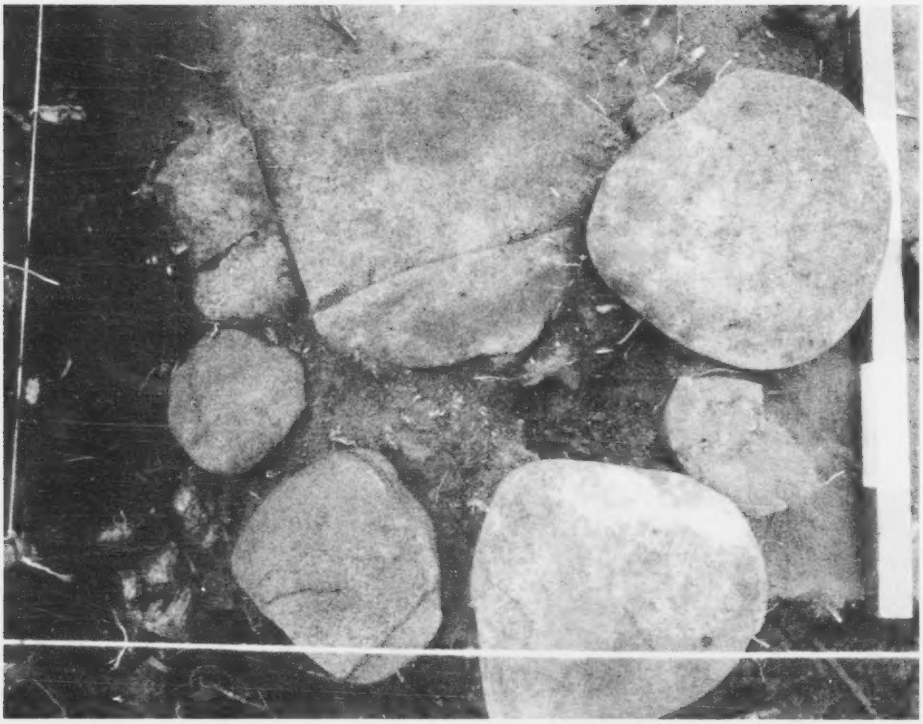


Figure 62: Rock Concentration

There are 14 inter-level refits, most of which are from adjacent levels 2 and 3; three refits are between levels 1 and 3. As with the general concentration of artifacts, the majority of refits occur in level 2 and the distances are quite short, suggesting a short-term occupation. The level 1-3 refits could probably be dismissed as errors in level discrimination during excavation and recording, and/or to post-depositional disturbance by various bioturbation factors. Level three, however, does have 11 within-level refits, suggesting some degree of integrity, but this is complemented by 11 refits across the 2-3 boundary. I feel that the presence of the level 3 refits, combined with the presence of 563 artifacts, 325 of which are faunal remains, suggests a separate component. The cross-level refits between levels 2 and 3 may therefore be explained by various natural disturbance factors and perhaps interpretation errors during excavation of the association of individual artifacts with specific layers.

There is no particularly new technological information that could be derived from the refitting study. There are close parallels with the Slump site, however, in reduction of small chert pebbles, and in quartzite cobble cores.

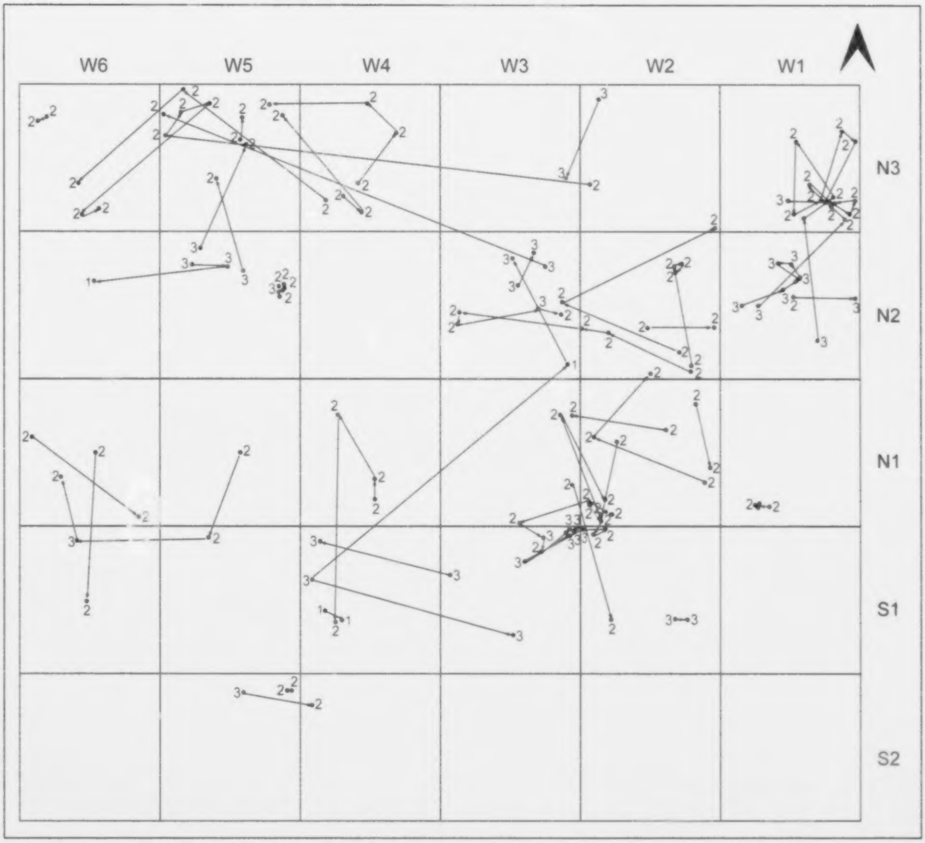


Figure 63: Map of Refits for Hidden Creek (Numerals refer to Levels)

Table 19: Refit Distances (Units in Metres)

	Within Levels			Between Levels	
	1-1	2-2	3-3	1-2	2-3
N	1	51	11	3	11
Mean	0.2	0.6	0.4	1.4	0.8
Min.		0.1	0.1	0.8	0.3
Max.		2.9	1.5	2.4	3.0
S. dev.		0.4	0.4	0.9	0.8

Artifacts

Table 20 itemizes the range of categories in the Hidden Creek collection recovered in 1980, at the time of discovery, and from the 1981 excavations. Descriptive and analytical protocols follow those outlined for the Slump site, except where indicated.

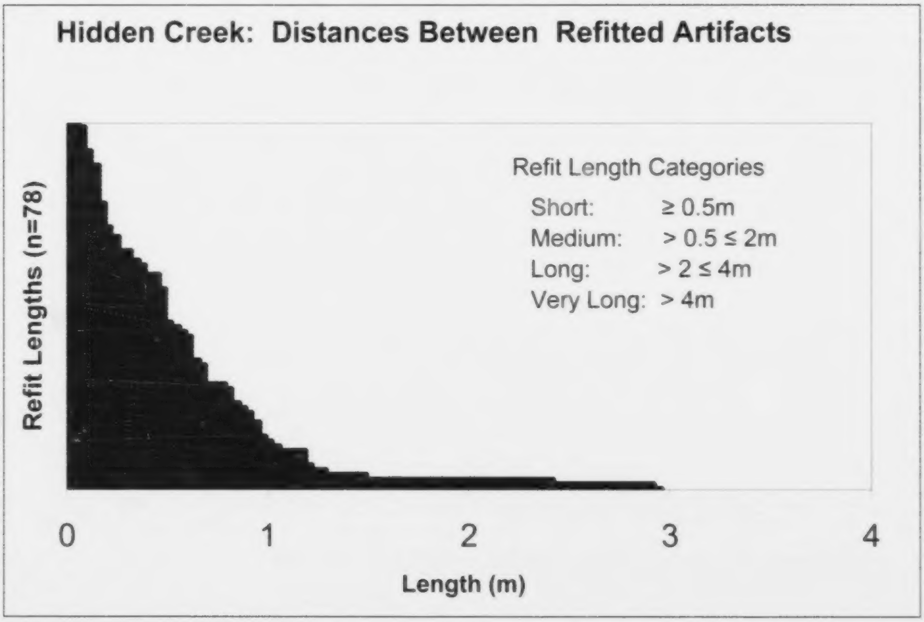


Figure 64: Distribution of Refit Distances for Hidden Creek

Organic

Bone and Antler Implements

With the possible exception of one specimen (Figure 66c), the artifacts in this category include broken and fragmentary pieces. The former example could represent the by-product of tool manufacture or may be a tool fragment. The latter possibility exists because there are no other indications of waste products related to antler or bone core reduction or shaping of implements. As in the case of the Slump site organic artifacts, I have provided individual descriptions of all of the recovered specimens.

Projectile Points

Two portions of unilaterally barbed antler projectile arrowheads from level 2 may actually be segments of a single point (Figure 65). The larger of the two is composed of two pieces; it is broken on both ends and the proximal two-thirds of the right margin has splintered away. A single square-topped barb is present on the distal third and has been formed by thinning one margin of the shaft by lateral whittling, then shaping the barb by diagonally cutting into the thinned edge, parallel to the long axis of the specimen. The resulting flat planes form the leading and trailing edges of the barb; the notch at the base of the barb has been formed by cutting (sawing?) from opposing surfaces to intersect in the notch. Surfaces were presumably whittled and scraped but are now fairly well eroded. Measurements are: l. 59.8 mm; w. 11.8 mm; t. 7.3 mm; wt. 2.9 g.

The second or possible distal segment of the foregoing example is broken on both ends (Figure 65). It has one complete, square barb near its proximal end and the remnant of a second near the distal end; both have been formed in the same way as the preceding point. The oval shaft exhibits parallel, flat facets and striations that indicate whittling and scraping. Measurements are: l. 30.7 mm; w. 10.0 mm; t. 6.0 mm; wt. 0.9 g.

Flesher or Wedge?

The distal end of an antler tool with a badly pock-marked, deteriorated surface was recovered from level 2 in a test pit excavated in the main west test trench in 1980 (Figure 65). It has been trimmed (whittled?) dorsally and laterally to taper to a convex, distal working edge; the latter does not have any serrations or "teeth." The ventral face has been whittled flat, particularly on the left side and in the area of the distal end. Heavy surface erosion has obscured any evidence of surface modification such as smoothing by grinding or polishing. Measurements are: l. 98.9 mm; w. 49.2 mm; t. 22.2 mm; wt. 51.5 g.

This object may be the distal end of a fleshing or defleshing implement (Steinbring 1966). These tools comprise part of a toolkit used for tanning

Figure 65: Dorsal and Ventral Views of Flesher or Wedge (184, level 2) and Barbed Point Fragments (top, 41; bottom 35/36). All from Level 2

Table 20: Artifact Categories for the Hidden Creek Site

Category	Level 1	Level 2	Level 3	No. Prov.	Totals
ORGANIC					
Bone & antler					
Projectile points		2			2
Flesher		1			1
Fragments		5			5
Production waste		1			1
Bark		3			3
Subtotals		12			12
LITHIC					
Debitage					
Flakes		111	38	10	159
Shatter	5	345	153	35	538
Cores		18	6		24
Bipolar split pebbles		2	1		3
Cobble spalls		2	8		10
Modified cobble spalls		6	3	1	10
Edge-modified flakes		16	17	3	36
Scrapers		18	6		24
Pièces esquillées		5	2		7
Bifaces		18	6		24
Biface implements		2	2	1	5
Projectile points		2	1		3
Anvils		3			3
Hammerstones		2	1		3
Subtotals	5	550	244	50	849
EURO-CANADIAN					
Gunflint	1				1
Lead shot	5				5
Comb parts	3	3			6
Wax	1				1
Subtotals	10	3			13
FAUNAL REMAINS					
Fish	49	623	17		689
Small mammal	11	34	7		52
Large mammal	16	237	301		554
Subtotals	76	894	325		1295
Grand Totals	91	1459	569	50	2169

large mammal hides such as moose and caribou (e.g., Steinbring 1966; Parker 1980) in the boreal forest, and bison and other ungulates on the plains (Frison 1991: Figure 2.85). Frison (1991:136) notes that:

> ***The serrated metatarsal scraper [i.e., flesher] ... and grooved maul... are widespread diagnostic items of the Late Prehistoric Period on the Northwestern Plains. The former was usually made from a bison metatarsal but occasionally the metatarsal of an elk was used.***

The tool was used for removing excess fatty tissue from the inner hide. Frison's comment on what was used to make fleshers parallels ethnographic (e.g., McKennan 1965: Plate 18d; Steinbring 1966; Rogers 1967:40-41) records from the subarctic, and, where preservation conditions are favourable, archaeological data as well (Le Blanc 1984: Plate 74d; Morlan 1973: Plates 18, 24). That is, subarctic fleshers are usually made of moose or caribou long bones, most often metapodials; moreover, the working end is usually serrated or has had "teeth" cut along the margin.

The Hidden Creek specimen lacks both attributes (i.e., material type and teeth), and may have been a wedge used in wood working activities rather than a defleshing tool. Wedges of various osseous (i.e., antler and bone [terrestrial and marine]) and wood have been found in a number of archaeological sites in western Canada (e.g., Bonnichsen 1979: Plate VIII-19; Dewhirst 1980:128-133, Figures 78-79; Inglis 1976:169; Le Blanc 1984: Plate 77; MacMillan and St. Claire 1982: Figure 75l; Mitchell 1971:212, Figure 123; Murray 1982: Figure 36c; Sanger 1970:98, Figure 41). The conventional interpretation for these tools is that they were used for splitting wood or logs. Ames and Maschner (1999: Figure 20), for example, illustrate the use of wedges to split boards from logs in a Northwest Coast context. However, wedges were probably versatile tools with a variety of other functions though other uses no doubt existed (e.g., debarking).

Implement Fragments

This group includes six specimens; all but one are from level 2. The latter example (Figure 66b) is made of bone and is broken on both ends. The sharp, double-bevelled margins taper from the wider, proximal break to the distal end. These edges have been formed by whittling and scraping of the dorsal and ventral faces; the latter surfaces have been scraped, as indicated by more-or-less parallel striations oriented along the long axis of the object. A slight amount of surface polish is also evident. Measurements are: l. 18.2 mm; w. 10.5 mm; t. 4.4 mm; wt. 0.7 g.

Three specimens are tip fragments. The first is made of antler and may be from an awl or projectile point. It is partially burned, but exhibits a moderate amount of polish on remaining surfaces opposite the break on one side and near the tip; there are no obvious striations that would suggest surface scraping. Measurements are: l. 15.3 mm; w 4.7 mm; t. 4.4 mm; wt. 0.2 g. The second tip fragment is also made of antler and is split longitudinally and broken on the proximal end. The ventral face is flat and appears to have been modified, although it is difficult to be certain. Part of the remnant tip exhibits several overlapping whittle facets. Measurements are: l. 20.0 mm; w. 4.8 mm; t. 3.7 mm; wt. 0.3 g. The third antler (?) tip segment is broken on either end, has rounded, bevelled margins, flattened oval in cross section, and calcined (Figure 66d). Surfaces have been whittled, scraped and polished. Measurements are: l 10.7 mm; w. 6.1 mm; t. 4.0 mm; wt. 0.4 g

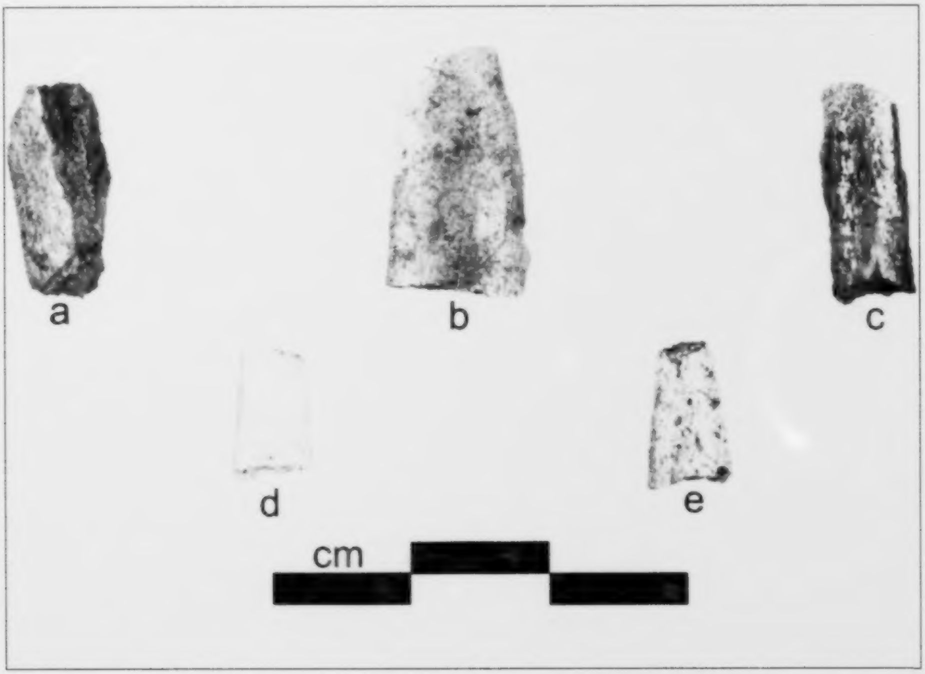


Figure 66: Fragments of Bone and Antler Implements: (a) 815; (b) 723; (c) 33; (d) 689; (e) 816. Level 2: a-b; Level 3: a, c-d

The last two examples include two shaft fragments and one miscellaneous piece. The first of the shaft fragments is antler (?) and it is split longitudinally and burnt on either end. The intact surface has been scraped. Measurements are: l. 13.0 mm; w 3.4 mm; t. 2.5 mm; wt. 0.2 g. The second shaft example consists of a piece of calcined bone with rounded, bevelled margins that converge to the narrower of the broken ends; both surfaces of the object exhibit evidence of whittling, scraping and polishing (Figure 66e). Measurements are: l. 9.6 mm; w. 6.0 mm; t. 2.4 mm; wt. 0.1 g. The last piece is a bone fragment which has slight polish on the remnant cortical bone surface (Figure 66a). Measurements are: l. 15.3 mm; w. 6.7 mm; t. 6.1 mm; wt. 0.8 g.

Production Waste

The single possible by-product of bone and antler implement manufacture is an antler fragment with two whittling facets on the original cortical surface (Figure 66c). Measurements are: l. 15.9 mm; w. 6.3 mm; t. 3.4 mm; wt. 0.4 g.

Bark

This category includes three well-preserved, tightly coiled strips of birch bark; all are from level 2. One example (#553) has been cut on one end, but the other two are unmodified. The rolls range from 51.5-63.4 mm in length, and 21.3-30.4 mm in diameter.

Lithics

Debitage

Flakes and Shatter

The analysis of the debitage from Hidden Creek was completed in the early 1980s, when it was considered fashionable to collect numerous variables, many of which are now regarded as redundant or of little discriminatory value (Le Blanc 1984; Magne 1985); in this case 24 variables (six continuous, 18 discrete) were recorded for the Hidden Creek debitage study. Even with this battery of attributes, however, it is not possible to replicate the types of analysis done for the Slump site, particularly those dealing with reduction stages, which are the most informative, and inter-material comparisons by debitage type (e.g., bifacial versus core reduction). Consequently, I have only included here information on size (Table 21) and the distribution of raw material types for flakes and shatter (Table 22). Nonetheless, it is possible to make some summary observations and comparisons with the Slump Site analysis.

Quartzites dominate at Hidden Creek, as they do for virtually all sites in the Lesser Slave Lake region, accounting for 67% of flakes and 63% of shatter. However, chert is also a significant player at 22% and 25% respectively. Flakes are fairly small with mean lengths of under two centimetres, and weights of about two to three grams. On average they are also wider than they are long, a characteristic that likely relates to the source and quality of the materials being used, namely waterworn quartzite and chert pebbles and cobbles collected from along the lake. Quartzite cobbles often have incipient ring cracks on their surfaces, created by impacts with other cobbles in the natural environment. Under the effect of hard hammer percussion, these cracks result in many flaking failures, as the striking platform usually collapses, creating large amounts of shatter, and short flakes. The chert pebbles are similarly affected, but in addition, they often have cleavage or rock planes that result in early termination of the flake (i.e., short flakes with step terminations).

Cores

Quartzite. Table 23 presents a descriptive summary for quartzite cores (n=2) and fragments (n=12). These objects range from pebble to cobble-sized specimens. Where it can be determined, platform angles vary from 70-100° (n=6, mean=82.8°, s. dev.: 9.8) and are predominantly cortex covered (n=4, 80%); only two flake scar lengths could be measured (23.2 mm; 35.2 mm). One specimen (#633) has one refitted element, in this case a piece of shatter that exhibits some discontinuous dorsal and ventral edge retouch and some edge wear; these modifications are likely a by-product of post-reduction use.

Quartzite pebbles and cobbles can now be found along the present, heavily vegetated shoreline in front of the site and may have served as a suitable source in the past; in this, GjPx-6 is somewhat similar to the Slump site situation.

Chert. A summary of basic information for 10 chert cores and fragments is presented in Table 24. Seven of these specimens have been partially reconstructed using various combinations of remnant cores and flake or shatter by-products. Four of these are composed of pieces from two stratigraphic levels (2, 3), reflecting the presence of some post-depositional movement. One of the refitted examples, a remnant core, resembles a classic pièce esquillée with opposed, heavily crushed ridges. The latter indicates the use of bipolar reduction techniques. The other six examples also exhibit some similar evidence of opposed points or areas of crushing or battering. Only four platform angles could be measured. These range from 66-85° (mean=73.3°, s=8.8°). The small number may be a reflection of the extensive use of bipolar reduction techniques in which platforms are frequently destroyed by excessive force.

Quartz. A single quartz pebble core from level 3 has a single flake scar on one corner. The scar suggests the object may have been flaked to assess the quality of the material, then it was discarded. Measurements are: l. 56.3 mm; w. 42.8 mm; t. 32.6 mm; wt. 102.5 g.

Modified Pebbles And Cobbles

Two waterworn quartzite cobbles and one pebble have various degrees of modification which suggest use as implements. The first is from level 2 (#335) and is made on a relatively flat cobble with a lenticular cross section and a roughly circular outline. One surface has several flake scars, the opposite has one. Two segments on the edge of the specimen exhibit bifacial crushing and battering, perhaps suggesting use as a chopper. Measurements are: l. 145.1 mm; w. 142.4 mm; t. 40.4 mm; wt. 1,052.4 g. The second specimen is tabular, roughly rectangular shaped, and has been flaked on opposite

Table 21: Summary Statistics for Hidden Creek Flakes and Shatter

	Variable		Level 1	Level 2	Level 3	No Prov.	Totals
Flakes		N		111	38	10	159
	Weight	Min.		0.1	0.1	0.1	0.1
		Max.		31.0	13.6	39.5	39.6
		Mean		2.6	2.1	4.5	2.6
		S. dev.		5.5	3.3	12.3	5.7
	Length	Min.		2.5	5.3	5.4	2.5
		Max.		42.0	49.0	46.0	49.0
		Mean		15.6	15.9	16.9	15.7
		S. dev.		9.0	10.7	12.1	9.6
	Width	Min.		3.9	3.3	8.0	3.3
		Max.		74.1	42.5	75.2	75.2
		Mean		19.5	16.8	20.8	19.1
		S. dev.		14.7	10.4	18.9	14.1
	Thickness	Min.		0.6	0.6	1.0	0.6
		Max.		16.3	10.4	15.0	16.3
		Mean		3.9	3.7	3.8	3.8
		S. dev.		3.2	2.8	4.1	3.1
Shatter	Weight	N	5	345	153	35	538
		Min	0.1	0.1	0.1	0.1	0.1
		Max.	32.9	55.2	52.5	82.0	82.0
		Mean	7.4	2.1	2.8	4.7	2.6
		S. dev.	14.3	5.9	7.6	14.6	7.6

surfaces; about 75% of the original cortex remains. None of the edges exhibits any wear. Three flakes can be refitted and there is some possibility that the object may have served as a core. The flakes are reddish brown and differ from the light brown of the parent piece, suggesting some post-detachment thermal alteration, possibly as a result of disposal in a hearth. Measurements are: l. 144.3 mm; w. 145.6 mm; t. 37.9 mm; wt. 827.5 g. The pebble is a thin, roughly circular plano-convex specimen that has a ground or worn area (12.0 x 22.0 mm) on one surface, and edges that are well-rounded; the latter may be a by-product of use. Measurements are: l. 80.6 mm; w. 77.2 mm; t. 16.3 mm; wt. 128.8 g.

Bipolar Split Pebbles

Three chert pebbles have been split by means of the bipolar flaking technique. The single specimen from level 3 has a columnar fracture facet on the left margin that originates from the primary ridge platform. The juncture between the columnar facet and the ventral surface is rounded and well-worn, probably due to use.

Table 22: Raw Material Types for Hidden Creek Debitage

	Material	Level 1	Level 2	Level 3	No Prov.	Totals
Flakes	Quartzite		51	16	4	71
	Vit. quartzite		32	4	1	37
	Chert		15	18	2	35
	Jasper				2	2
	Siliceous siltstone		12		1	13
	Mudstone		1			1
Subtotals			111	38	10	159
Shatter	Quartzite	2	118	47	17	184
	Vit. quartzite	3	111	32	7	153
	Quartz		4	4	3	11
	Chert		63	62	8	133
	Siliceous siltstone		49	6		55
	Petrified wood			1		1
	Mudstone			1		1
Subtotals		5	345	153	35	538
Totals		5	456	191	45	697

Table 23: Summary of Basic Attributes for Quartzite Cores

Cat.#	Level	Length	Width	Thick.	Weight	Comments
1074	2	95.1	105.5	67.5	725.2	Made on a large spall
437	2-3	67.3	103.2	80.0	233.2	Refitted: 1 remnant frag.; 14 flakes
436	2-3	52.0	94.9	34.2	127.1	Refitted: 1 remnant frag.; 1 flake, 2 pcs. shatter; may be part of #437
457	2	27.8	45.1	16.4	15.2	Refitted core frag.; 4 pcs. of shatter
507	2	71.4	26.3	24.5	47.7	Core shatter
214	3	194.6	162.1	50.3	2306.4	Refitted; core remnant, 2 flakes
538	2	37.5	35.9	26.4	27.9	Core shatter
633	2	91.2	70.7	29.4	146.2	Refitted: 3 flakes, 3 pcs. of shatter
427	3	39.4	35.7	12.0	11.3	Core shatter
639	3	116.9	114.9	89.0	1196.0	Refitted: 2 large fragments
638	3	65.5	57.7	57.8	188.6	Core fragment
298	2	56.1	78.5	26.8	220.1	Core fragment
330	2	91.0	45.4	33.6	178.5	Core fragment
444	3	67.7	55.6	45.3	135.3	Exhausted core
Totals	N	14	14	14	14	
	Min.	37.5	26.3	12.0	11.3	
	Max.	194.6	162.1	89.0	2306.4	
	Mean	76.7	73.7	42.4	397.1	
	S.dev.	42.0	38.4	23.6	638.4	

Table 24: Basic Attributes for Chert Cores

Cat.#	Level	Length	Width	Thick.	Weight	Comments
226	2-3	39.8	40.4	27.0	40.4	Refitted: 6 flakes, 3 split pebble frags, 1 pièce esquillée; bipolar reduction
88	2-3	76.7	69.0	26.4	154.6	Refitted: 3 flakes, 3 pcs. cubical shatter, 1 pc. flake shatter; bipolar reduction
54	2	30.0	31.7	13.8	14.4	Refitted: 1 core remnant, 3 flakes; bipolar reduction
381	2	67.7	25.5	21.4	31.9	Remnant: bipolar reduction
755	2	24.0	23.9	15.5	9.8	Refitted: 1 exhausted core remnant, 1 flake: bipolar reduction
45	2	56.1	43.7	17.0	23.4	Core fragment
309	2	12.2	12.6	4.6	0.6	Core shatter: bipolar reduction
396	2-3	24.3	14.8	11.4	3.7	Refitted: 2 pcs. core shatter; bipolar reduction
655	2	34.9	24.7	8.8	5.6	Refitted: 3 pcs. core shatter
573	2-3	34.6	22.8	11.4	7.7	Refitted: 5 pieces core shatter
Totals	N	10	10	10	10	
	Min.	12.2	12.6	4.6	45.9	
	Max.	76.7	40.4	27.0	154.6	
	Mean	40.0	30.9	15.7	29.2	
	S.dev.	20.6	16.6	7.4	45.9	

Table 25: Summary Attributes for Bipolar Split Pebbles

Cat. No.	Level	Length	Width	Thick.	Weight
703	2	28.0	15.3	5.8	3.0
936	2	24.7	25.1	5.2	3.1
426	3	33.0	24.4	11.6	9.7

Cobble Spalls

Ten unmodified quartzite cobble spalls include two complete examples from level 2 (mean length: 64.8; mean weight: 85.1), two broken specimens (level 2, 335.8 g; level 3 137.6 g), and six fragmentary pieces of spall shatter (wt.: level 2, n=3, mean: 67.0 g; level 3, n=2, mean: 51.4 g; and one without level provenience, 82.0 g).

Modified Cobble Spalls

Table 26 presents a summary of basic metric and non-metric attributes for ten modified cobble spalls; two of these deserve some additional commentary. The first (Figure 67a) has steep bifacial flaking on the concave lateral margins, giving the object a somewhat waisted appearance. The convex proximal and distal margins exhibit ventral retouch and there is a small area of pecking on the cortex covered dorsal face.

The second, and most elaborately modified specimen (#336), is ovoid in outline and is made on a thick spall. It has been steeply retouched on the ventral face around the entire perimeter and the thinning retouch scars extend approximately one-third of the distance into the body of the object. The retouched edges are worn and have angles ranging from 60° to 75°. The dorsal surface is cortex-covered except for two flake scars on the proximal end that may represent platform preparation for the detachment of flakes from the ventral surface.

Table 26: Modified Cobble Spalls

Level	Cat. No.	Length	Width	Thick.	Weight	Locus[a]	Face[b]
2	1064	86.7	61.9	14.7	105.4	All	Bf
	34/58/469	127.8	116.7	44.1	746.0	Lf, Ds	Bf, Bf
	327	64.7	101.0	14.4	100.8	Rt, Ds	ER
	708	60.6	112.5	23.7	117.4	Ds	ER
	557	84.5	56.0	18.3	112.2	Px	D+ER
	978	93.2	76.0	30.0	220.5	Rt	D+V+ER
3	665	90.1	42.0	17.6	65.3	Ind	ER
	336	125.1	80.5	32.4	416.3	All	V+ER
	571	66.0	45.5	14.8	42.3	Px,Dx,Rt	D,D,V
Test Pit #1	1089	99.1	131.7	39.3	356.3	Lf	ER+V
Totals	N	10	10	10	10		
	Min.	60.6	42.0	14.4	42.3		
	Max.	125.1	112.5	44.1	746.0		
	Mean	89.8	82.4	24.9	228.3		
	S. Dev.	23.3	31.7	10.9	220.6		

a.Rt-right; Lf-left; Dx-distal; Px-proximal; All-Rt, Lf,Ds,Px; Ind-indeterminate

b.Bf-bifacial; D-dorsal; v-ventral; ER-edge rounding

Edge Modified Flakes

Artifacts in this category were recovered from levels 2 (n=16) and 3 (n=17); there were also three specimens from test pits that have no specific level provenience. Raw materials consist of quartzite (n=8, 22.2%), vitreous quartzite (n=6, 16.7%), and chert (n=22, 61.1%). The location of the modified edges includes proximal (n=2, 2.2%), right (n=7, 15.2%), left (n=15, 32.6%), and distal (n=16, 34.8%) edges; six (13.0%) are indeterminate. Most of the modification is on the dorsal face (n=23, 50%). Ventral face retouch accounted for only seven edges (15.2%); other varieties included dorsal plus ventral (n=4, 8.7%), bifacial nibbling (n=2, 4.4%), and edge rounding (n=6, 13.0%); four were indeterminate (Figure 67d, j-k). Table 27 presents a summary of metric attributes.

Table 27: Basic Attributes for Edge Modified Flakes

Level		Length	Width	Thick.	Weight
2	N	16	16	16	16
	Min.	10.0	6.0	1.4	0.1
	Max.	39.9	48.2	15.3	7.7
	Mean	24.0	22.4	6.0	5.4
	S. Dev.	11.0	13.9	3.8	7.7
3	N	17	17	17	17
	Min.	6.8	8.9	1.9	0.2
	Max.	50.5	44.2	15.4	19.7
	Mean	24.5	22.2	5.7	4.3
	S. Dev.	13.0	10.3	3.9	4.6
N.P.	N	3	3	3	3
	Min.	29.8	13.5	3.6	2.1
	Max.	36.0	26.2	7.3	3.3
	Mean	32.0	21.9	4.9	2.5
	S. Dev.	3.4	7.3	2.1	0.7
Totals	N	36	36	36	36
	Min.	6.8	6.0	1.4	0.1
	Max.	50.5	48.2	5.4	30.1
	Mean	24.9	22.3	6.5	4.6
	S. Dev.	11.6	11.6	5.4	6.4

Pièces Esquillées

As with GiQa-3, pièces esquillées are flake-based objects with opposing zones of percussion. The sample from Hidden Creek includes five specimens with ridge-ridge configurations and two with area-ridge platforms (i.e., primary platform [or end that was struck]-basal zone [end in contact with anvil]) (Figure 67c, e, g). Table 28 provides a summary of basic attributes.

Scrapers

Table 29 presents a summary of basic metric attributes for 24 scrapers from levels 2 (n=18) and 3 (n=6) (Figure 67). Raw materials include quartzite (n=3), vitreous quartzite (n=11), chert (n=9), and silicified siltstone (n=1). Where retouched edges can be identified with respect to standard flake orientation, the distal ones are the most frequently modified (n=12, 52.2%); right and left edges were nearly equal (n=6, 26.1% and n=5, 21.7% respectively). Modified edge configurations are predominantly convex (n=19, 70.4%) followed by straight (n=5, 18.5%); concave, notch-like, and irregular edges are each represented by one (3.7%) specimen.

Table 28: Summary Attributes for Pièces Esquillées

Level	Cat. No.	Length	Width	Thick.	Weight	Material	Config^{a}.
2	42	27.0	26.0	8.2	7.0	V. qtzite	r-r
	462	20.5	26.8	8.1	4.1	V. qtzite	r-r
	212	32.2	44.2	10.0	15.2	V. qtzite	r-r
	471	18.6	22.0	5.1	2.4	V. qtzite	r-r
	699	14.8	18.6	9.9	2.4	V. qtzite	a-r
3	722	21.0	19.5	9.2	3.7	Qtzite	a-r
	1076	30.5	20.2	11.3	7.2	Chert	r-r
Totals	N	7	7	7	7		
	Min.	14.8	18.6	5.1	2.4		
	Max.	18.6	44.2	11.3	15.2		
	Mean	23.5	25.3	8.8	6.0		
	S. Dev.	6.5	8.9	2.0	4.5		

a.r-r=ridge-ridge; a-r=area-ridge

Three scrapers deserve additional comment. The first of these is a vitreous quartzite specimen (#762) that was initially a scraper with a modified right margin and then was used as a pièce esquillée. The scraping edge served as a primary platform; battering on this margin destroyed the cutting edge of the original scraper. There are also opposed crushed edges (area-ridge) at approximately right angles to the previous pair.

The second specimen in this group is also made of vitreous quartzite and appears to have been reworked from a fragment of a unifacially retouched tool. It also has a retouched, rather thick triangular tip which exhibits some evidence of use, as indicated by localized crushing.

The last example, which is from level 3, is a triangular quartzite specimen (#239, Figure 67b) that is distinctive in having invasive flaking over the entire dorsal face; ridges between the scars are fairly heavily worn. The right and left edges exhibit wear, but the distal edge, which is very acute (39°) is only slightly rounded.

Table 29: Summary of Basic Metric Attributes for Scrapers

Level		Length	Width	Thick.	Weight	Max. Edge Height	Max. Edge Angle
2	N	18	18	18	18	16	16
	Min.	13.3	6.5	3.1	0.5	3.3	50
	Max.	52.0	40.0	22.4	18.1	11.7	70
	Mean	28.3	23.6	8.4	5.8	6.1	62.8
	S. Dev.	10.8	8.0	4.5	4.5	2.4	6.8
3	N	6	6	6	6	4	6
	Min.	19.1	7.8	5.1	0.5	3.7	49
	Max.	37.4	25.6	22.4	18.1	11.7	72
	Mean	28.9	19.4	6.9	3.8	6.1	55.0
	S. Dev.	9.3	6.2	1.3	2.1	3.1	8.6
Totals	N	24	24	24	24	20	22
	Min.	13.3	6.5	3.1	0.5	3.3	49
	Max.	52.0	40.0	22.4	18.1	11.7	72
	Mean	28.4	24.9	8.0	5.3	6.1	60.7
	S. Dev.	10.3	8.5	4.0	4.1	2.5	8.0

Bifaces

Included here are three complete projectile points, and one complete and five fragmentary bifacial implements.

Projectile Points

The first example (#527, Figure 68c) is a black chert side notched point with excurvate blade margins, a slightly convex base, and rather broad, and shallow notches; it was found in level 3. Facial flaking is complete over both surfaces and consists of shallow, expanding flake scars. The latter are well-executed, since there are several inclusions in the raw material, but virtually no irregularities as a result. Margins exhibit very little edge retouch, but all are ground, including the notches and the base. Measurements are: l. 46.0 mm; w. 25.2 mm; t. 6.8 mm; wt. 8.1 g.

This point resembles the Besant type (cf., Gruhn 1971: PlateVI, G), although there is considerable variation within the range of Besant points, particularly in the morphology of the notching. Another reasonable possibility is presented by an illustration of an Early Taltheilei point illustrated by Gordon (1996: Figure 6.4, top row, rightmost specimen). Gordon places Early Taltheilei at 1,800-2,450 years ago (Gordon 1996:117). The earliest date from Hidden Creek (see Table 33) falls within this range, but it also overlaps the dating for the Besant Phase (Dyck 1983:113).

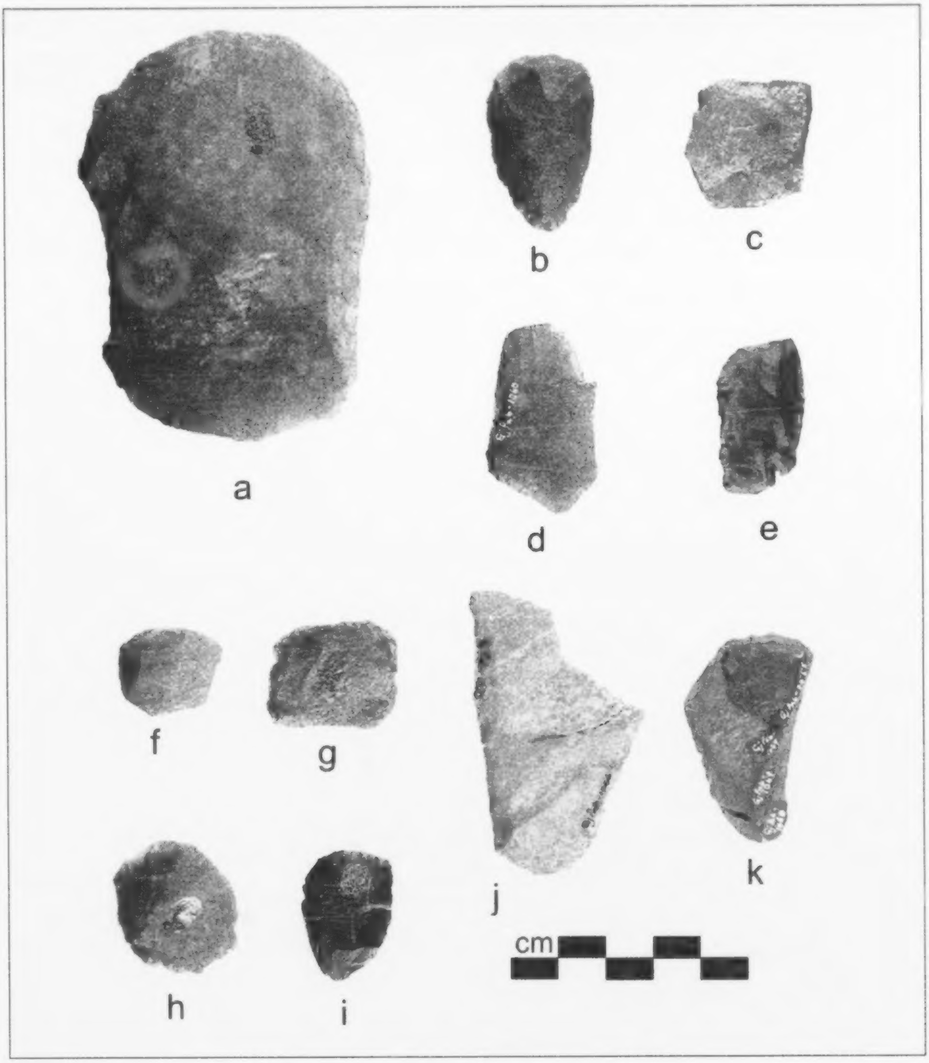


Figure 67: Modified Spall (a), 1064; Scrapers (b, 239, f, 425; h, 722; i, n/a); Pièces Esquillées (c, 471; e, 1076; g, n/a); Edge Modified Flakes (d), 1060; (j), 1035/1066; (k), 1068. Level 2: a, d, k; Level 3: b, e-f, h; Level 2/3: j

The second projectile point is from level 2 and is also made of black chert. It is triangular in shape with more or less straight sides and base (Figure 68d). It has facial flaking over all surfaces but unlike the preceding specimen, is less regular and rather thick near its midpoint. All edges are sharp and exhibit some edge trimming or sharpening, particularly on the ventral face. Measurements are: l. 42.5 mm; w. 18.0 mm; t. 6.5 mm; wt. 4.3 g. McCullough (1982:Figure 9m-n) illustrates two triangular bifaces from Lac La Biche that he identifies as Eastern Triangular, and compares to "Mayer-Oakes' (1970:131, Figure 56, C) Eastern Triangular-Tear Drop points" (McCullough 1982:113). The Hidden Creek example seems better matched with the isosceles variety illustrated by Mayer-Oakes (1970: Figure 56B). Morlan illustrates an example (1973: Figure 27f) from the Late Prehistoric Klo-kut site in the northern Yukon that is similar, even down to measurements, to the Hidden Creek triangular specimen.

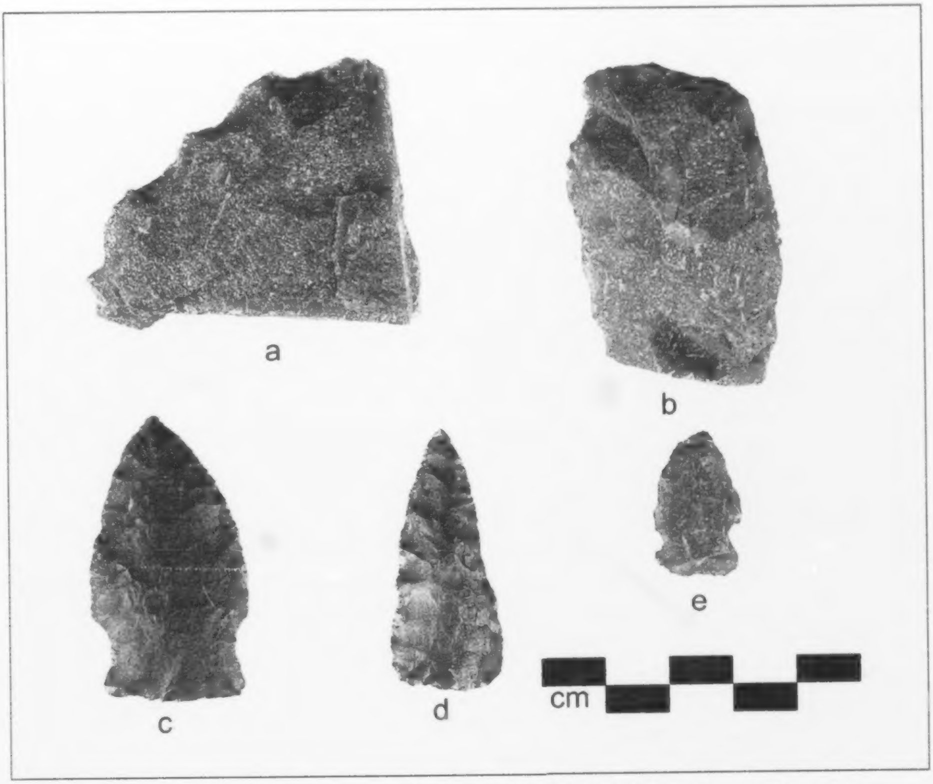


Figure 68: Hidden Creek Bifaces: (a) 435; (b) 1091, (c) 527, (d) 763, (e) 724. Level 2: a, d-e; Level 3: c

However, these small bifaces are rather generic in typological terms, and may actually be preforms for Late Prehistoric Period point types such as Plains/Prairie Side-Notched. In this regard, Dawe (1987) has observed in reference to the Head-Smashed-In Buffalo Jump, that triangular examples are likely preforms destined for various Late Prehistoric Period notched arrowheads. Many of these at HSI are made of exotic raw materials since there is no suitable local material for point manufacture. Consequently, he has argued that "projectile points were often brought to the site in the form of notch-ready performs and... those made of exotic materials may represent imports obtained by trade. Notching was done on site at the time of retooling to fit particular design requirements of the haft and perhaps to satisfy idiosyncratic preferences" (Dawe 1987:161). The exchange of triangular preforms may be much more widespread than the Canadian plains, perhaps penetrating well into the boreal forest.

The last point in this group is a crudely made, slate side-notched specimen from level 2 (Figure 68e). It has a biplano cross section and has been shaped using only bifacial edge trimming. The edges, notches, and base are ground. Measurements are: l. 23.4 mm; w. 14.1 mm; t. 3.1 mm; wt. 1.3 g.

Bifacial Implements

The evidently complete example of this group of five specimens is a parallelogram-shaped quartzite specimen recovered from a test pit; there is no specific level provenience (Figure 68b). It has complete invasive flaking over the dorsal and ventral faces; edges exhibit a slight amount of grinding. Measurements are: l. 50.0 mm; w. 38.2 mm; t. 12.6 mm; wt. 23.2 g. The second specimen is made of quartzite (#565) and appears to be broken on the proximal (?) end; it was recovered from level 2. It is completely flaked over both faces; edges are thick, rather sinuous in outline, and worn or ground. Measurements are: l. 47.2 mm; w. 47.8 mm; t. 15.5 mm; wt. 36.5 g.

Specimen three (Figure 68a) is also quartzite and was found in level 2; it is broken longitudinally and transversely. It appears to have been made on a cobble spall, but no cortex remains. Facial flaking is present on the entire dorsal surface, but only edge trimming is evident on the ventral face. The remnant bifacial edge is irregular with several spurs the points and concavities of which are worn. Measurements are: l 53.8 mm; w. 45.5 mm; t. 13.2 mm; wt. 36.7 g.

The fourth biface is quartzite, is broken proximally and was recovered from level 3. Only the left margin has been bifacially flaked; the latter is sinuous and well-ground. The convex right and distal margins exhibit discontinuous dorsal and ventral edge nibbling; they are also moderately worn. Measurements: l. 37.7 mm; w. 31.0 mm; t. 11.0 mm; wt. 12.5 g.

The last specimen is a quartzite fragment that may be from the tip area of a projectile point. Because of the small size and raw material type, no flake scars are evident; margins adjacent to the tip are well-ground. Measurements are: l. 13.0 mm; w. 18.5 mm; t. 4.7 mm; wt. 0.9 g.

Anvils

Three waterworn quartzite cobbles, two complete and one broken, have small, discrete areas of heavily crushed, shallow concavities on major surfaces. These areas suggest their use as anvil supports, possibly for the purposes of bipolar flaking; all were found in level 2. One example (#434) has crushed areas on opposing surfaces. The broken specimen (#337) is split through the crushed zone and presumably broke as a result of direct of blows to this area. Measurements are listed in Table 30.

Hammerstones

Three specimens consist of waterworn quartzite cobbles with areas of crushing/battering on ends or rounded lateral margins; two were found in level 2, the third in level 3. Two examples (#935, #383) each have one flake scar; one of the latter (#935) appears to have resulted from use as a hammer (Table 31).

Table 30: Summary Attributes for Anvils

Cat. No.	Length	Width	Thick.	Weight
337	88.0	84.3	62.2	620.7
434	96.4	73.6	48.1	449.2
659	103.8	88.7	54.4	719.9

Table 31: Basic Attributes for Hammerstones

Cat. No.	Length	Width	Thick.	Weight
210	150.7	116.7	97.6	1829.7
383	102.5	46.4	45.4	224.3
935	76.4	62.0	52.0	290.6

Euro-Canadian Artifacts

Items of Euro-Canadian manufacture were found in level 1 (n=6) and level 2 (n=7). The provenience of the latter, in what is otherwise a pre-contact level, is likely due to root displacement. The artifacts include one gunflint, five pieces of lead shot, one celluloid comb shank and five tooth fragments, one piece of wire, and a small oval disk of wax.

Gunflint

The single gunflint is from level 1 and is made on a grey-brown flint flake or spall (Figure 69d). The raw material is probably English and the blank type, a flake rather than a blade segment, indicates a pre-1850 date of manufacture (Heinz Pyszczyk, pers. comm., 1984). The small size of this specimen (l. 21.0 mm; w. 16.2 mm; t. 6.8 mm; wt. 3.4 g) suggests it was completely exhausted.

Lead shot

Five pieces of lead shot were found in level 2 in one, 1 x 1 metre unit. The average diameter is 5.7 mm (0.22") and weights range from 1.0-1.1 grams; they appear to be equivalent to 00 size buckshot.

Comb Parts

The comb shank and teeth (Figure 69a-b) were found in levels 1 (n=3) and 2 (n=3). The broken shank has no teeth and is burned on one end. Measurements are: l 56.6 mm; w. 11.2 mm; t. 4.1 mm; wt. 2.0 g. The five teeth are all fragments and vary from 6.8 to 14.9 mm in length, have a mean width of 3.9 mm and thickness of 0.7 mm and range form 0.05 to 0.1 grams in weight.

Wire

The single piece of metal wire is from level 1, is 40 mm long and has a diameter of 4.3 mm.

Wax

The small oval disk of wax (l. 17.8 mm; w. 16.4 mm; t. 6.1 mm; wt. 0.8 g) has a slightly off-centered hole, 3.2 mm in diameter (Figure 69c). It may represent a candle remnant.

Faunal Remains

Faunal remains were recovered from all levels, though the majority from levels 2 and 3. The analysis of the sample was completed by T. Schowalter (n.d.) in the early 1980s. Table 32 summarizes the bone frequencies.

Although 1,295 bones were recovered, the total weight amounted to only 1,047 grams, a situation similar to that at the Slump site. Bones in all levels were highly fragmented, likely because of the same variety of factors as indicated previously for the Slump site. However, at Hidden Creek, the faunal specimens from level 3 had suffered from considerable surface deterioration and the level 2 bones "…had been chewed and eaten..." (Schowalter n.d.), possibly by various carnivores.

Nonetheless, a few species were identified. Among the mammals, there were moose, lynx, and likely wolf, varying hare (the most common of the small mammals), muskrat, and *Microtus*, though the latter are likely intrusive. Some fragments of a deer-sized ungulate mandible were found. The identification of the wolf remains "is based upon a partial radius and ulna from a large canid... [that]... are similar in size to the same elements from a 40 kg wolf..." in the comparative collection. The canid elements showed evidence of being "extensively chewed." Small mammal bone amounted to 16.4 g. Most of this was hare, but two muskrat elements were also noted.

Only northern pike was positively identified in the fish bones, most of which came from level 2 (98.89 g). A significant proportion of total weight came a complete northern pike cranium and another partial one.

As was the case at the Slump site, there is little definite that can be said about seasonality, as most of the identified fauna could be found at any time of the year.

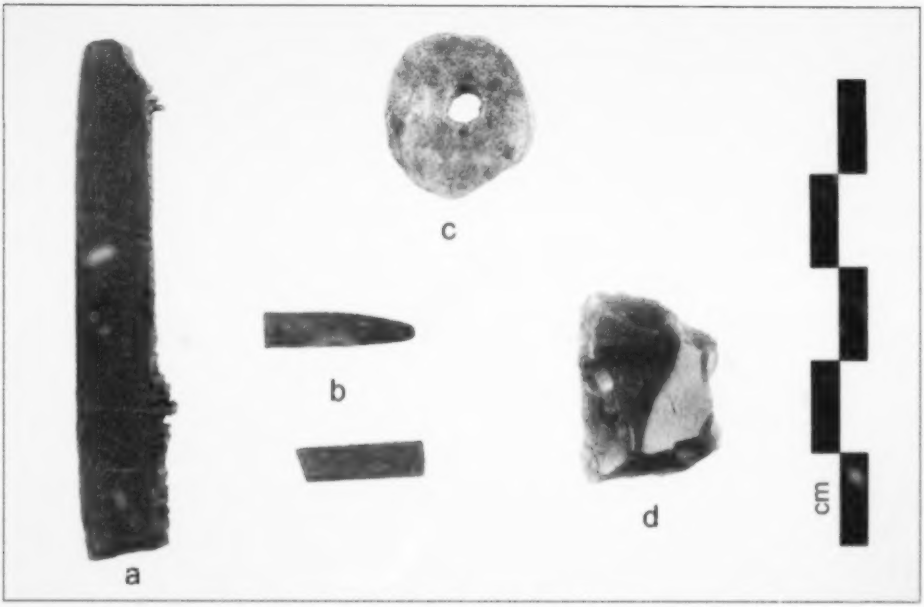


Figure 69: Contact Period Artifacts: (a–b) Comb Parts; (c) Wax; (d) Gunflint

Table 32: Summary Counts for Hidden Creek Faunal Assemblage

	Level 1	Level 2	Level 3	Totals
Taxon	N	N	N	N
MAMMAL				
Hare	7	7	4	18
Small mammal	4	27	3	34
Large mammal	16	237	301	554
ID to class only				
Class subtotals	27	271	308	606
FISH				
Northern pike	12	53	3	68
Other species	11	26	1	38
ID to class only	26	544	13	583
Class subtotals	49	623	17	689
UNIDENT.				
Totals	76	894	325	1295

Chronology

Five samples of bone (n=4) and charcoal from levels 2 (n=2) and 3 were submitted for radiocarbon dating (Table 33). Like the dates from the Slump Site, those from Hidden Creek are also difficult to interpret. For example, the single charcoal sample (Beta 7838) was modern, likely because a portion of a burnt tree root was misinterpreted in the field as a valid sample for dating. Moreover, with the exception of BGS-1933, the remaining bone dates had elevated standard deviations, and one, BGS-1932, was too small for isotope correction. Nonetheless, those from level 3 indicate a pre-contact date that overlaps approximately with the earlier dates from levels 2/3 at GiQa-3. Also, the dates are consistent with the types of projectile points recorded for the Slump site. The single date from level 2 has a 2 sigma range spanning about the last 500 years, but it too may well relate to the most recent part of the pre-contact record in Alberta.

Table 33: Radiocarbon samples from GjPx-6

Lab. No.	Material	Date	δ13%	Calibrated 2 sigma[a]
S-2172	Fragmented large mammal from bone (187.5 g); N3W4 level 3	1270±315	N/A[b]	cal BP 1865 (1231, 1204, 1182) 804
S-2173	Calcined and burned bone (166.5 g); S1W6, N1W6, level 3	745±215	N/A	cal BP 1064 (671) 317
Beta-7838	Charcoal from hearth feature, N2E29, N2E30 (11.12 g), level 2	Modern	N/A	
BGS-1932	Bone (180g), level 3	1880±170	too small	cal BP 2303 (1820) 1405
BGS-1933	Bone (150g), level 2	397±90	-24.56	cal BP 549 (476) 0*

a. Calidbrated using CALIB 4.1.2 programme (Stuiver et al. 1998; Stuiver and Reimer 1993)

b. Not available

Summary

In most respects (e.g., technology, tool categories, faunal assemblage, local situation, and age), Hidden Creek is similar to the Slump site. Differences are evident, however. For example, access to raw materials is more limited compared to GiQa-3, as there are no local glacio-fluvial deposits to provide a source of quartzite cobbles and pebbles, not to mention those of other materials, such as cherts and siliceous siltstones. There is currently a diffuse band of cobbles at the base of the terrace on which the site is situated. As GjPx-6 is only a few kilometres east of the major gravel deposits north of Shaw's Point, just west of the Slump site, it is conceivable that the cobbles in the neighbourhood of Hidden Creek represent a "smear" deposited as a result of ice-rafting from the west.

Even accounting for the difference in the size of the excavated areas between the two sites (GjPx-6, ~38 m²; GiQa-3, ~92m²), there is significantly less evidence of cobble-core technology at Hidden Creek, perhaps suggesting that reduction activities such as occurred at the Slump site were not as prevalent. There is also a suggestion of greater use of cherts at Hidden Creek, as opposed to the Slump site. Cherts account for roughly 8% of Slump site lithics whereas at Hidden Creek they represent about 24%. The significance of this difference likely relates to the greater availability of quartzite at the Slump site and the evidence for workshop-like activities associated with using these materials.

The survival of any evidence of osseous technologies is rare in southern boreal forest sites, but both Slump site and Hidden Creek have produced a few specimens indicative of what must have been an important element of the technological repertoire of Lesser Slave Lake foragers. Organic technology is somewhat better represented at Hidden Creek where there are three, clearly recognizable tools: a broken antler flesher or wedge, and parts of two unilaterally barbed arrowheads. The former could be associated with hide or wood working, though as I have argued above, the latter may be more likely. The barbed arrowheads were likely used for hunting rather than fishing, though the lack of a proximal end makes it difficult to be conclusive. Hunting points usually have conical tangs for hafting to the end of arrow shafts, whereas fishing points have spatulate, bevelled tangs for attaching to the sides of the shaft. Such points were used in pairs, and the bevelling was designed to make the points to splay out away from the shaft, so as to create what in effect is a small leister.

The stone projectile point sample at Hidden Creek is very small indeed. The larger side-notched specimen may be a Besant type, thus providing a link with the plains, or it could be an Early Taltheilei form, and therefore suggest a northern influence, extending ultimately to the western Northwest Territories. The Besant Phase dates in the period between 2,000-1,150 years ago (Dyck 1983), while Early Taltheilei falls between 1,800 to 2,450 BP (Gordon 1996). At two sigma, the two earliest radiocarbon dates from level 3 at Hidden Creek are consistent with either of these ranges. The third radiocarbon date from level 3 (745±215 rcyBP) overlaps the most end of the Besant period, but the date may also be as late as 300 years ago. It and the level 2 date of 397±90 rcyBP likely pertain, therefore, to the occupation represented by the small side-notched point.

Besant points have a wide distribution in the northern Plains, but are quite rare in the boreal forest of Alberta. Vickers (1986: Figure 15), for example, shows a distribution map of Besant Phase sites that places the overwhelming majority in the plains and parkland regions of Alberta. Only seven are recorded outside of this area: three in northeastern Alberta and the rest in the northern Foothills, north of Grande Cache. The comparative rarity of Besant in the southern boreal forest may suggest that the Hidden Creek point is more likely due to some type of northern, Taltheilei Tradition connection. Because of the small sample size, it is likely premature to speculate on the significance of this relationship. It could, for example, indicate some type of northern influence (e.g., exchange), or it could reflect something about the origins and early development of Taltheilei somewhere in northern British Columbia (cf., Gordon 1996). More research in the latter region will be necessary to address some of these important issues associated with the development and spread of presumed Athapaskan traditions such as Taltheilei, but also Taye Lake in southern Yukon. I will return to this aspect in the last chapter.

The other small notched point is rather amorphous. It could fall in the range of Prairie Side-notched, which would also be compatible with the later range of the radiocarbon dates. Vickers (1986: Figure 17) indicates at least two sites in the boreal forest along the Athabasca River, so though rare as well, this Late Prehistoric Plains type would not be totally unexpected.

CHAPTER 5

Synthesis and Conclusions

Systematic study of the pre-contact history of northern Alberta began in the early 1970s and continues to this day, albeit mostly in the realm of legislatively mandated heritage studies associated with hydrocarbon extraction and forestry (e.g., Bryan and Conaty 1975; Conaty 1973, 1977, 1978; Dawe 1997; Donahue 1976a, 1976b; Gruhn 1981; Ives 1977, 1981a, 1981b, 1981c, 1982, 1985, 1990; Le Blanc and Ives 1986; Le Blanc and Wright 1990; McCullough 1976, 1982; Pollock 1977, 1978a, 1978b; Pyszczyk 1990, 1991; Ronaghan 1981; Sims 1976, 1977, 1981; Stevenson 1985, 1986; Syncrude Canada 1974; Thomson 1973; Wood 1978; plus numerous archaeological permit reports in the so-called "grey" literature). However, there are still to be some areas of the province, north and south of Lesser Slave Lake, for example, that remain poorly known. It is against this backdrop of current knowledge that this study should be viewed: it represents an initial statement about a relatively small area of Alberta's boreal forest, albeit one that is dominated by the largest lake in the province. In this concluding chapter, I wish to summarize the results of our investigation, then integrate these the archaeological record of pre-contact history in the Western Subarctic.

Research Challenges in the Boreal Forest

Boreal forest archaeology presents many challenges to researchers. This is evident in a recent synthesis of Canadian archaeology (Wright 1995, 1999a). For example, in reference to the early evidence from the "Northwest Interior" of Canada, Wright states:

> ***Sites often are spread over large areas as veneer deposits that defy component separation or even a context for radiocarbon samples. Many sites were reoccupied seasonally for thousands of years. The impact of bioturbation (biological disturbance caused by tree falls, bears digging out gophers, etc.) and cryturbation [sic] (disturbance caused by freeze and thaw cycles to sedimentary deposits) on the archaeological deposits have then further mixed the sparse evidence. The difficulty of isolating components carries the corollary of a limited number of trustworthy radiocarbon dates. Added to the problem of trying to isolate components is the simple nature of the stone tool kit and its conservative persistence over time. And, given the generally acid soils resulting in an absence of bone, analysis is usually limited to the chipped stone portion of the technology. (Wright 1995:173)***

Elements of this view are reiterated with some additions, for different regions of Canada's boreal forest biome (e.g., Wright 1995:295; Wright 1999a:721, 779-780 in reference to the Canadian Shield; and, Wright 1995:404; Wright 1999a: 109, again for the Northwest Interior), and there is no doubt a similar impression is widely held. Indeed, I have heard comments from colleagues who work elsewhere in North America that there are no large sites in the boreal forest, particularly stratified ones; no hearths survive; and even statements asserting that nobody lived in the boreal forest because they either passed though it from one region to another, presumably better area to live, or only visited it for short-term hunting expeditions! Even a cursory review of the subarctic ethnographic literature should easily dispel the latter misconception, and the current state of the archaeological record, with rich, complex, and deeply stratified sites in some regions (cf., Morlan 1973; Le Blanc 1984; Stevenson 1985, 1986) indicates that generalizations like the foregoing are highly dubious; the boreal forest has almost certainly been continually occupied since the disappearance of the continental glaciers.

Nonetheless, Wright speaks from the perspective of years of field work in the Canadian Shield (e.g., Wright 1968, 1970, 1972, 1975, 1981) of Ontario, Québec, Manitoba and the Northwest Territories. In some ways, he is correct: constructing culture-historical sequences, and making regional comparisons in boreal forest archaeology can be difficult because many sites are small and unstratified; there often is a paucity of implements, particularly diagnostic artifacts such as projectile points; and there can be limited opportunities for radiocarbon dating. All of these factors have clearly played a role in the results of the present study.

No doubt at least some of the reasons for these problems lie the nature of subarctic subsistence systems: small highly mobile groups of people moving frequently across the landscape left little residue of their passing. Compounding this are the site formation issues noted by Wright as well as generally slow soil development leading to little or no separation between layers, and therefore "collapsed-stratigraphy" or "veneer-like" levels that make it difficult or impossible to distinguish individual components. Sites in sedimentary terraces along rivers, a common trait for boreal forest sites, may not survive the constant shifting of river channels unless they are bedrock defended (Schweger pers. comm., 1980; i.e., terraces are located downstream from bedrock outcrops that deflect the channel away from the terrace along the same bank, thus preventing its destruction through erosion). The acidity of boreal forest soils, of course, adds to the problem because it can rapidly strip away the perishable component of what existed in systemic context (Schiffer 1987), including tools of bone, antler, hide, and wood, as well as faunal remains.

The latter factor is even of greater consequence when the relative poverty of lithic tools in subarctic sites may be due to the much diminished role that stone played in a hunting technology that relied more on organic materials, such as osseous (bone or antler) weapon tips (barbed and unbarbed) and facilities such as traps and snares made of wood and/or babiche or sinew (Le Blanc 1997). Reliance upon such perishable materials, as well as wood, hide, plant fibres, etc., is widespread in the boreal forest, as ethnographic information indicates (e.g., Osgood 1940; Rogers 1967). Indeed, these materials comprise the overwhelming majority of the material culture inventory; moreover, this has undoubtedly been the case for thousands of years.

One of the most common elements of boreal forest hunting technologies is the babiche or sinew snare (e.g., Cooper 1938; McClellan and Denniston 1981). McClellan and Denniston (1981:372) note in reference to Cordilleran Athapaskans that:

The importance of the snare can scarcely be overstressed. It is portable, able and effective, snares could be used high in the mountains for sheep, caribou, ground squirrels, or ptarmigan; in the forest for bear, moose, caribou, wapiti, hare, grouse, and several kinds of furbearers; in the tall grass for waterfowl; and under water for beaver and some fish.

Snares have a number of advantages for hunters. In large numbers, snares could be used to maximize returns for small game like hares or ptarmigan. Snare lines for hares, for example, could thus be used near camps by virtually any member of a group, old or young. Moreover, once setup, snares function with minimal user intervention, thus freeing hunters and other individuals to engage in other activities, subsistence or otherwise. When used in the hundreds in combination with trapping systems such as communal surrounds, snares provided a highly effective harvesting system for caribou (e.g., Clark 1987; McFee 1981; Warbelow et al. 1975), with the potential to take dozens of animals or more at one time.

Importantly, snares and weapons made of osseous material can almost completely replace weapon systems with stone tips, thus resulting in far fewer of these being necessary for hunting gear. In turn this reduces the need for access to good quality toolstone for production, maintenance and replacement of weapon tips. Finally, there are good ethnographic (summarized in Ellis 1997) and experimental data (e.g., Pokines 1998) indicating that osseous weapon tips are more reliable than those made of stone, thus further diminishing the role of stone in subsistence technology.

Greater reliance on osseous materials for weapon tips can have significant consequences for archaeological systematics in the boreal forest: there are few if any stone projectile points for culture-historical purposes. Also, given that soil conditions can rapidly eliminate all organic remains, the remaining lithic assemblages can be characterized as having few different types of tools (i.e., low richness), and small numbers within any specific type (i.e., low eveness; Leonard and Jones 1989). Indeed, assemblages may be dominated by scrapers, retouched flakes and debitage.

Where conditions are advantageous, however, boreal forest sites have produced rich and complex organic technologies covering a wide variety of functions including weaponry. They are, however, accompanied by simple if not expedient chipped stone industries with very few "diagnostic" bifaces (e.g., Le Blanc 1984; Morlan 1973). The presence of a barbed antler point and a wedge at the Hidden Creek site, as well as fragments of other organic tools from it and the Slump site are vestiges of an organic-based technology in the study area. Therefore, it is probably not surprising that the number of diagnostic projectile points from the study area is limited, and that this may be characteristic of many areas of the subarctic.

Terminology

Systematics are not well-developed for the archaeological record of the boreal forest in Alberta. Consequently, researchers there tend to use the generalized scheme applied to the plains, namely, the Mulloy system of Early, Middle and Late Prehistoric periods, as modified by Reeves (see Vickers 1986 for a summary of the various systems that have been proposed for the plains). This system is subdivided on the basis of changes in projectile technology (i.e., spears, atlatls, bow and arrow), and makes use of specific plains point types as diagnostic identifiers. It seems inappropriate to apply this system to the archaeological record of Alberta's boreal forest, as there are influences from the much farther north that introduce new variation to the region.

Consequently, I have chosen to use the more generic system proposed by Wright (1995, 1999a,b) as a classificatory device for organizing his synthesis of Canada's pre-contact Aboriginal history. At the highest level, his scheme includes five sequential time periods: Period I (10,000-8,000 BC), Period II (8,000-4,000 BC), Period III (4,000-1,000 BC), Period IV (1,000 BC to AD 500), and Period V (AD 500 to the present). These are further subdivided on the basis of units based on broad geographical/environmental regions that are loosely conceived of as 'cultures'. The plains area, for example, has Early, Middle, and Late divisions, as does the Northwest Interior, which would include Yukon and large portions of the Northwest Territories, and northern Alberta.

Within any specific period, Wright uses previously defined local and regional sequences, cultures, complexes, and so on, to synthesize culture-history. His proposal, therefore, is not a replacement for detailed regional sequences that are widely used by archaeologists within different regions, in some cases for decades. This helps to facilitate communication between regional specialists. The only problem with the scheme is for areas where there is evidence for influence from more than one region, as in the case of northern Alberta. As will become evident below, the Lesser Slave Lake area has evidence for influence from both the plains and Northwest Interior regions.

Lesser Slave Lake and the Northwest Interior Culture

Period I

The earliest portion of the temporal sequence is not well-represented in the Lesser Slave Lake region, especially around the lake itself. A possible representative of this time in the broader study area may by indicated by the presence of macroblade technology at the Burley site (GiQf-4), as I discussed in Chapter Two. These specimens comprise part of a small sample of blades and blade-tools (11 to nearly 16 cm long) collected from surface contexts in five sites in the Fairview to Grande Prairie region of northwestern Alberta (Le Blanc and Wright 1990). They have also been reported from adjacent British Columbia (Wilson 1987, 1996), and a single specimen illustrated by Millar (1981b:Figure 2, bottom) from the Fisherman Lake locality of southwestern North West Territories also appear to be a macroblade, albeit one modified into a point.

As I noted before, the Peace country macroblades resemble Clovis blades from the southwestern United States (Green 1963; Haynes 1982, Collins 1999). The Alberta examples are similar in overall size and morphology, although they are somewhat flatter in longitudinal profile than the blades. One of the Burley site examples also has a transverse burination on a break (Le Blanc and Wright 1990:Figure 2), a technology which is also shared with the Clovis blades (Collins 1999:178; Figure 2.1c, Postscript Figure 1h-j).

The association of macroblades with the Clovis culture in the southwestern United States indicates a Period I date, and the same interpretation may prevail for the Peace Country macroblade specimens. However, none of the latter has been found in association with any fluted projectile points, nor in any dated context. Fluted points are well-known in the Peace River area of northwestern Alberta (e.g., Magne and Ives 1991; Bereziuk 2001). Magne and Ives (1991:Figure 25), for example, have noted the presence of 13 findspots of fluted points around Grande Prairie, and have observed that the area has one of the highest densities of these point types in Alberta (Gryba 1985b, cited in Magne and Ives 1991; Gryba 1985a, 1988). Dawe (1997) has recently described an impressively large fluted specimen (broken but estimated to be about 10 cm long) from the same region that he argues is a Folsom-type point.

The adjacent Peace country of British Columbia is also known for the presence of sites with fluted points (e.g., Fladmark 1981; Fladmark et al. 1988; Wilson 1987, 1989, 1996), the most well-known of which is Charlie Lake Cave near Fort St. John. Here, Knut Fladmark and his team found in situ a small basally-thinned Clovis-type point (or as it is more prosaically called a "stubby"), in Component I in the deepest strata of the site (Fladmark et al. 1988). Several radiocarbon dates secure the dating of Component I to approximately 10,500 BP. As with so many other sites of this age, however, the fluted point was associated with an assemblage of only nine additional items, including a perforated schist bead, a retouched flake, a keeled core-tool, and six pieces of debitage. On the plus side, faunal material was preserved, with evidence for mammals such as bison, hares and ground squirrels, as well as various birds and fish, all of which suggest a diverse economic base, as well as providing useful palaeoenvironmental information.

Despite the presence of macroblade technology, there is no indication yet of any early microblade material in northern Alberta belonging to the Palaeo-Arctic Tradition or the Denali Complex that can date to as early as 12,000 BP in Alaska (e.g., Holmes et al. 1996). Microblades and microcores have been found in northeastern Alberta at the Bezya site (Le Blanc and Ives 1986) and near Fort Vermilion in the northwest part of the Province (Pyszczyk 1990, 1991). Only Bezya has been dated (3,990±170 rcyBP), but solely on the basis of a composite charcoal sample. This single date could indicate a Middle Northwest Interior presence, possibly belonging to the Northwest Microblade Tradition. Alternatively, the date may be incorrect and the assemblage may well be older or even younger.

Microblades have been found in many other areas of Alberta (for a summary see Le Blanc and Ives 1986:85), including a microcore from Vermilion Lakes in Banff National Park in a context dated to a little before 10,000 BP. This occurrence indicates the possibility that Denali complex technologies had penetrated southward from Alaska-Yukon. However, early microblade cultures along coastal British Columbia (e.g., Ground Hog Bay, Namu) could point to western rather than northwestern influence. The data, however, are far too sketchy for anything but speculation.

Period II: Early Northwest Interior

There are lanceolate bifaces from the study area that suggest a possible Plano period occupation that probably dates to the early part of Period II. Tentatively, these include specimens from the Zuelke site, located north of Grouard Mission. However, as I noted in Chapter Two, lanceolate points that resemble early forms can be considerably younger. A good example of this problem in Alberta is illustrated by the Karpinsky site located between Grande Prairie and Fairview in northwestern Alberta where lanceolate forms (Bryan and Conaty 1975: Plate 1c, 2b) superficially like Palaeoindian points were dated to 1,070±55 rcyBP (Bryan and Conaty 1975:68, 81). As the authors pointed out, the best comparison would be with Taltheilei (ibid.:82), most likely with the Middle part of the tradition (c. 1,500-600 BP; e.g., Gordon 1996: Figure 5.2).

More convincing evidence for Period II are undated specimens from the aforementioned Burley site. In addition to the macroblades there are two finely made lanceolate bifaces that resemble Eden points (Plano) in terms of morphology and the overall excellence in workmanship (Figure 22).

The Peace River country around Grande Prairie has also produced a range of unfluted lanceolates, including Alberta, Eden and Scottsbluff types (cf., Archaeological Society of Alberta n.d.; Fladmark 1981; Wormington and Forbis 1965), but there are no dates. However, a deeply stratified site on Saskatoon Mountain, located near Grande Prairie, has produced a date of 9,380 ± 350 B.P. on pit-fill containing carbonized seeds from a level near the base of the site (Beaudoin and Wright 1993). According to a reconstruction of the local glacial and post-glacial topographic history (Liverman 1991), the site would have been on an island during the first major stage of glacial Lake Peace. Although there were no diagnostic artifacts associated with the date, it likely pertains to a generalized Plano period.

Several sites on Tar Sands lease area, northeast of Fort McKay, are yielding a range of stemmed and lanceolate points estimated to date from c. 9,900 to 7,800 or so followed by notched points until 7,000 BP (Saxberg and Reeves 2003). These finds have been grouped into a series of complexes. Fort Creek Fen (9,900-9,400 BP), which is the earliest, is characterized by a thin lanceolate point, which the investigators believe is similar to specimens from sites in Wyoming and Montana dating to about 9,500 BP. This complex occupied the landscape shortly after a catastrophic flood through the region, caused by the rapid draining of Glacial Lake Agassiz (Fisher 1993;

Fisher and Smith 1994; Fisher and Souch 1998). Fox Creek Fen is followed by the Nezu complex (c. 9,400-8,500 BP), which has points that relate to Northern Plano and the Cody Complex. The Cree Burn Lake Complex with Agate Basin- and Lusk-like forms follows (9,400-7,750 BP). Side- and corner-notched point forms replace the lanceolates after 7,750 BP in the Early Beaver River Complex (c. 7,750-7,000 BP). As no radiocarbon dates have been obtained, the chronology is based on estimates made on drainage features associated with the Agassiz flood. Work is still in progress.

Period III: Middle Northwest Interior

The early part of this period is only slightly better represented in the study area than the earlier ones. There is currently no evidence for early notched points such as Boss Hill Corner-Notched (Doll 1982) or Mummy Cave Series (cf., Vickers 1986) types (e.g., Bitterroot). Finds of two notched points that may resemble Oxbow (a single find from west of Buffalo Bay) and Pelican Lake (one point from the east side of the Lesser Slave Lake) varieties suggest a later Period III occupation, although at best, the evidence is meagre.

However, Oxbow, McKean, and Pelican Lake types have been found elsewhere in northern Alberta (e.g., Northeast Alberta: Calling Lake, Gruhn 1981; Lake La Biche, McCullough 1982; Fort McMurray, Pollock 1978b; Birch Mountains, Donahue 1976b; Northwest Alberta: Caribou Mountains, Conaty 1977, 1978). Some of these point-types may represent evidence of incursions of plains hunters into the boreal forest, particularly along the southern margins of the region. Changes in vegetation patterns over time may have facilitated this movement, as the southern fringe of the boreal moved north or south, or as hunters followed game into the parkland ecotone. Equally plausible, however, is that point types moved without people, diffusing in some fashion via intergroup contact or trade with people who had long been residents of the boreal regions from Saskatchewan to British Columbia. Thus, plains-like projectile types in the boreal forest may well be local derivatives of plains types that are more prolific to the south.

The same may be said for plains-looking points in the Northwest Territories (e.g., Millar 1981a, Figure 1). In his synthesis of the prehistory of the western N.W.T., Noble referred to the presence "Four very poorly represented complexes from the northern Plains... between 3,000 B.C. and A.D. 200" (Noble 1981:99). These complexes include Artillery Lake (3,000-2,500 B.C); Oxbow (2,500-1,500 BC); Caribou Island (1,500-1,000 BC), which is defined by the presence of Duncan points; and Pelican Lake (AD 1,200). While the latter three are clearly recognizable as plains-derived, the first is not as easy to identify. The diagnostic point type is described as "long, narrow quartzite lanceolates with mildly convex bases..."(ibid.). Noble states they are likely "derived from central Saskatchewan."

In a more recent treatment of western NWT prehistory, Gordon (1996:144-145) includes Artillery Lake into the Taltheilei Tradition, a Barrenland cultural unit with no plains association; this seems reasonable. Gordon has also noted that the presence of plains points in the N.W.T. (e.g., Oxbow, Duncan, Pelican Lake, and Besant) probably occurred "without Plains hunters likely being present...It is likely these points were carried north by... hunters who had met overwintering Plains hunters taking bison in the aspen parkland-forest transition." I think this might also be a valid hypothesis for the distribution of these points varieties in the northern Alberta, including the Lesser Slave Lake region, and particularly, as they are not at all common.

Absent from the study region is any indication of microblades or notched points that might relate to the spread of the Northern Archaic Tradition into the Yukon, then on to Alaska. The concept of the Northern Archaic Tradition (NAt) was initially proposed by Anderson (1968) to account for the appearance at around 6,500 BP of side-notched points at the Onion Portage site on the Kobuk River in northwestern Alaska. These asymmetric-shaped points and their associated remains, were thought to have replaced the earlier microblade-bearing tundra cultures represented by the American Paleoarctic Tradition. Anderson believed that the return of spruce forest to the region from further south in response to dramatic post-Pleistocene climatic warming was accompanied by forest-adapted hunters. These people were thought to have come from the Great Plains, where notched points of appropriate age (e.g., Bitterroot) were fairly common and would have provided an appropriate source for the technology.

The Northern Archaic was widely adopted by Alaskan archaeologists, and seems to have become popular in Yukon archaeology, though more so in the central and southern portions of the Territory, than in the north. With the exception of the northeast Yukon centred on the upper Rock River (Gotthardt 1990), where there seems to be some type of localized early, 7,500 BP expression of the Northern Archaic Tradition, much of the mid-Holocene is poorly represented, in spite of three decades of fieldwork. In contrast, the Northern Archaic seems to be well represented in the southern Territory, as demonstrated by Workman's research in the Aishihik-Kluane lakes region (his work occurred in the late 1960s-early 1970s; Workman 1978). He used Anderson's hypothesis to explain a technological break that occurred in the culture-historical sequence in southwest Yukon at about 4,500-5,000 BP, when the microblade technology of the Little Arm Phase, thought to extend back to 7-8,000 BP, was replaced by Northern Archaic Tradition people, as represented initially by the Taye Lake Phase, a term proposed earlier by MacNeish (1964). This new manifestation was characterized by Workman as relying:

> ***on notched, straight and concave base projectiles, a variety of heavy bifaces, endscrapers, and unifaces, lack of microblades and microcores, and sparse and rudimentary burins. (Workman 1978:414)***

By contrast, Little Arm technology laid:

> ***emphasis on microblades, a variety of burins, round based projectile points, delicate flake gravers and unifaces, a simple assortment of heavy thick***

> ***endscrapers and lack of emphasis on most of the diagnostic characteristics of Taye Lake. The changes appear to have been far-reaching enough that one thinks in terms of movement of peoples rather than diffusion of ideas. (Workman 1978:414)***

The migration was broadly conceived as the same one responsible for the break in the sequence at Onion Portage. In southwest Yukon, the Taye Lake Phase persists until 1,500 BP, after which a final pre-contact phase, Aishihik, ushers in the Bennett Lake Phase and contact with Euro-Canadians. The continuity may imply some type of ancestral Athapaskan tradition, although Workman was suitably cautious, preferring instead to use the more general term Na-Dene (Workman 1978:429). Language and tools often vary independently as Donahue (1977) has discussed in reference to the western subarctic and the plains.

Since its initial formulation, the Northern Archaic Tradition has become more difficult to apply in the strict sense of the original definition. For example, although once considered to be representative of an interior forest-adapted culture, people using an Northern Archaic-type of technology appear to have been equally at home on the tundra. This is indicated by Lobdell (1986) who reported on a Northern Archaic component with a single date of 6,000 BP found on a pingo on the Arctic Coastal Plain of Alaska, and work by Sutherland (1991; Bertulli and Andreasen 1992:6) and Swazye (Bertulli and Berglund 1993:17-18) on a site on Tuktoyaktuk Peninsula, Northwest Territories (NkTM-8; Le Blanc 1988, 1994a). It seems that Northern Archaic people, or at least people who used side-notched points, were equally at home above the tree line.

Another problem that has dogged the concept almost since the beginning is the presence or absence of microblades in association with side-notched points. Although as initially conceived, microblade technology was lost in the transition to Northern Archaic (to distinguish it from the preceding American Palaeoarctic), it seems that, and for whatever reason, side-notched points appear to have an affinity for co-occurring with microblades. Site formation problems may be responsible for some of this problem since Northern Archaic sites often occur as surface scatters, or at localities where there is little chance for sediment accumulation. Added to this are the constants of cryoturbation effects (Mackay et al., 1961; Bowers et al., 1983; Schweger 1985; Esdale 2001, Esdale et al. 2001), and in many circumstances bioturbation as well. Moreover, given the tendency for people in northern environments to gravitate to specific locations on the landscape for resource extraction activities over hundreds or even thousands of years, mixing of components is highly likely.

To complicate matters further, however, side-notched points are consistently found with microblades in some areas of the Western Subarctic, the Mackenzie Valley being one such area. Morrison (1987) found this to the case after synthesizing information from a number of sites in the Mackenzie Valley. On this basis he concluded that the Mackenzie Valley assemblages with these point types and microblades must relate to another archaeological culture, most likely the venerable Northwest Microblade Tradition, which has been with us for nearly 50 years (MacNeish 1953, 1954, 1955, 1964). Moreover, Morrison suggested that since notched point sites in the Mackenzie Valley are all later than 6,000 BP, it is unlikely, therefore, that the valley served as a possible migration route to the north for Northern Archaic from a presumed southern origin on the plains. Adding to the difficulty is the fact that some of the earliest dates for Northern Archaic occur at the end of the proposed migration route, in the northeastern Yukon (Gotthardt 1990).

The evidence from the Lesser Slave Lake study area seems to suggest that like the Mackenzie Valley, northern Alberta did not serve as part of a possible migration route for the northward spread of the Northern Archaic Tradition.

Period IV-V

The late pre-contact history in the Lesser Slave Lake region of the southern boreal forest is dominated by two major themes: continued influence from the plains, as represented by a variety of small, notched points, and much stronger indications of connections with the northeast, as shown by projectile points that can be related to the Taltheilei Tradition (2,600 BP-contact). The latter tradition was initially defined by Noble (1971, 1977, 1981) on the basis of his work between Great Bear and Great Slave lakes. This was then expanded by Gordon's research farther east in the District of Keewatin (Gordon 1976, 1977, 1996).

The connection with Taltheilei is suggested by stemmed projectile points from GjQc-5 and GiQa-3 that are comparable to examples from Early (500 BC-AD 150) and Late Taltheilei (AD 800-contact) Tradition sites (Noble 1971, 1981; Gordon 1976, 1977). Noble (1971, 1977, 1981) believed that the Taltheilei Tradition represented the development of an Athapaskan culture, but maintained that its origins were unknown. Gordon (1977), however, suggested on the basis of projectile point similarities that northern British Columbia or northern Alberta may be the likely homeland for Taltheilei. In his most recent statement on this matter, Gordon notes that "Earliest and Early Taltheilei were forest-adapted, reinforcing my belief that they originated in northwest British Colombia, moved down the Peace and Slave Rivers, and entered the range north of Lake Athabasca" (Gordon 1996:239). Evidence to support or refute this origin hypothesis is still not available, however, as the archaeology of northern British Columbia is still poorly known. However, the presence of Early Taltheilei-like points in the Lesser Slave Lake region may give some support for this suggestion, while the existence of Late Taltheilei points in the study area suggests continued long-term contact in some form or other with the centre of Taltheilei development east of Great Slave Lake.

The presence of another Athapaskan continuum in Southwest Yukon introduces some additional complexity. I am referring here to the afore-mentioned Taye Lake-

Aishihik-Bennett Lake phases (Workman 1978). Workman placed these phases in the Northern Archaic Tradition (Workman 1978:415), and maintained that there was continuous development beginning approximately 4,500 years ago, when there was a technological break from the preceding Little Arm Phase, which is characterized by blades and burins. According to Workman (1978), the change was due to a migration of people from areas to the southeast, following Anderson's definition of and proposal for the origins of the Northern Archaic Tradition (Anderson 1968, 1988). As discussed previously, there are many questions concerning the usefulness of the Northern Archaic Tradition as an explanation for the type of technological change in the Southwest Yukon and elsewhere as well. Also important is the nature of possible relationships between the Taltheilei Tradition and the Taye Lake to Bennett Lake phases. Wright (1999a:977-1009) has reviewed the evidence concerning these two Athapaskan manifestations in connection with his discussion of "Late Northwest Interior Culture" (i.e., 1,000 BC-AD 500). He refers to Taltheilei and Taye Lake using

> ***...the catch-all classification "complex" ...to reflect the uncertainty of the relationship between Taye Lake and Taltheilei. Taye Lake has the greatest time depth, extending well into Period III (4,000-1,000 BC) and likely earlier, while the Taltheilei complex was the product of an exceptional eastward movement of people, likely coming out of northeastern British Columbia and the adjacent Yukon Territory via the Peace River and the Liard River, both major tributaries of the Mackenzie River. (Wright 1999:978)***

Wright points out that the nature of the relationship between the two complexes is difficult to determine because of the lack of information from the Mackenzie River Valley (1999a:1008). As noted earlier, this is compounded by lack of information from northern British Columbia and Alberta. Since Taye Lake is older, it might be tempting to derive Taltheilei from it, although there is not much evidence to make the linkage, and most researchers would probably hesitate to do so. A possible suggestion is that both derive from some parent culture, perhaps the Northwest Microblade Tradition, in the southern Yukon, northern British Columbia-Alberta region, and that it diverged sometime in the early first millennium BC. It is beyond the scope of this study to explore this proposal in any detail. However, a cursory examination of published illustrations of Taye Lake phase and Taltheilei Tradition collections (e.g., Workman 1978; Gordon 1996) leaves me with the impression that the two have a similar "flavour" in terms of the large size of the tools and the morphology of the bifaces.

One aspect that is significant about the evidence for Period V occupation in the study area is the complete absence of pottery. Ceramics are present in sites east of the Lesser Slave Lake region, perhaps the best known being from a site on Lac La Biche (McCullough 1982; Connor Learn 1983, 1986), 140 km southeast of Lesser Slave. Pollock (1978b:134) has also recorded ceramics from a site on a lake 40 km north of Lac La Biche, and Gruhn (1981) has described the presence of a couple of tiny fragments from Calling Lake, about 90 km east of the study area. Eastern Alberta boreal forest pottery is thought to relate to the westernmost extension of the Selkirk-Composite (Meyer and Russell 1987) that is considered to be evidence of northern Algonkians, the "...direct ancestor of those peoples who became known as Crees..." (Meyer and Russell 1987:27). The Selkirk-Composite is thought to have originated "...in the central boreal forest of Manitoba" (ibid.) and subsequently expanded westward.

The lack of pottery from Period V sites in the Lesser Slave Lake region may reflect sampling error, though there are no reports of pottery from sites west and northwest of the study area. Alternatively, it could reflect some of the complex history of Cree and Athapaskan (Beaver and Slavey) movements during the late pre-Contact to Contact period. For example, according to a map made by Peter Pond (dated 1787), the Beaver may have originally inhabited the Lesser Slave region (Lamb 1970, facing p. 13). In contrast, Alexander Mackenzie, while staying at Fort Fork, which he established near the confluence of the Peace and Smokey rivers, stated that

> ***The Indians informed me, that they had been to hunt at a large lake, called by the Knisteneaux [Cree], the Slave Lake, which derived its name from that of its original inhabitants, who were called Slaves. They represented it as a large body of water, and that it lies about one hundred and twenty miles due East from this place. (Lamb 1970:249)***

In a footnote to this quotation, Lamb indicates that the lake referred to is Lesser Slave. The term "Slave" presumably refers to the Slavey, who now live in far northwestern Alberta and the upper Mackenzie River in the Northwest Territories.

Ives (1990:126-133) has reviewed evidence from several historic and ethnographic sources concerning these population shifts in the 18th century, including work by Gillespie (1981). He suggests that Gillespie's interpretation that Athapaskans of "the Lesser Slave Lake region were undoubtedly Peace River Beaver Indians" (Ives 1990:131, in reference to Gillespie 1981:161), seems most reasonable. However, by the late 18th century, the Cree had displaced the Beaver to the west of the lake. The absence of pottery may therefore be a combination of pre-Contact/Contact period occupation by Beaver Athapaskans who did not use ceramics, followed by Contact period Cree who had abandoned pottery-making by the time they had moved into the area, likely because they had been trading with Euro-Canadians on Hudson Bay for about a century, and were using replacements for ceramic vessels made of copper and iron. Thus, current archaeological evidence seems to mirror the understanding of historic and ethnographically documented demographic shifts that overlapped the appearance of Europeans in northern Alberta.

Trade/Exchange

Traces of various types of raw materials indicate that people in the Lesser Slave Lake area participated in a web of far-flung relationships in Western Canada. As discussed in Chapter 3, for example, analysis of obsidian artifacts from the Slump site indicates a source near Anahim, British Columbia, on the Fraser Plateau in the traditional territory of Chilcotin Athapaskans (Wilmeth 1978). This source is about 1000 kilometres in direct-line distance from the Slump site. Similarly impressive is the presence of Tertiary Hills Tufaceous Clinker at two sites (GiQa-3, GhPv-1) on Lesser Slave Lake, the source being more than 1700 kilometres to the northwest near Fort Norman, N.W.T.; this source is also in a area of Athapaskan groups (Mountain Indians and Hare [Helm 1981]). The effective distance that people would have to travel is in both cases is likely to have been considerably greater. In addition, the artifacts made of the obsidian derive from a pebble, materials are not finished tools but rather flakes and shatter. As discussed in Chapter 3, given the distance and cost of transportation, it would seem more logical to expect some type of exchange system (e.g., down-the-line) rather than direct procurement, and a relationship where tools rather than debitage were the objects being traded.

Earlier, I suggested the possibility that glacio-fluvial transport may have also played a role in the final destination of these two materials. One cannot rule out, however, the symbolic role certain that exotic stone materials could have had in the past. Jones and White (1981) and Taçon (1991), for example, have studied the religious power of stone within the context of Aboriginal societies in Arnhem Land, Australia. Such notions of power may have been associated with obsidian and Tertiary Hills Tufaceous Clinker, thereby contributing to the vast geographic distribution of these materials and their appearance in sites in the Lesser Slave region.

The jadeite adze and the steatite pipe from the Madsen site must have arrived in the study area via exchange networks. As noted earlier, the adze likely arrived from British Columbia (cf., Mackie 1995), but the origin of the steatite pipe is uncertain. However, sources of this material near Banff (Spence 1940) suggest that the pipe might have been produced in Alberta, and moved through local trading networks.

Conclusion

Lesser Slave Lake has been attractive to human use for several thousand years. Before European contact, the area provided a variety of fish, bird, animal, and plant resources, as well as material for making stone tools. People living in the area engaged in trading relationships that extended over a wide area of western North America. Obsidian artifacts from the Slump site suggest that a pebble of this material arrived within the last several hundred years from the western interior of British Columbia. The Tertiary Hills Tufaceous Clinker, jadeite adze and steatite pipe may have appeared in the study area. Projectile point types indicate influences from the plains going back at least to the Middle Prehistoric Period and from the Northwest Territories or perhaps the Yukon, as long ago as 3,000 years. Lanceolate points and macroblades indicate an Palaeoindin presence as well, though this is less well represented than the other time periods. At the dawn of European penetration of the region, it appears that Beaver Athapaskan peoples populated the lake area, but were displaced by Cree moving in from the east.

Following European contact, the lake became part of the Saskatchewan District (with Fort Assiniboine and Jasper House) and was a major supplier of furs and provisions (pemmican and fish) for the fur trade. Until quite recently, the lake supported a commercial fishery, fur farming, and since beginning of the twentieth century, and especially after the 1930s, a strong agricultural economy that continues to expand. More recently, petroleum projects, forestry, and tourism have contributed to the economic activity and historical development of the region. In the inevitable changing of land and people, Lesser Slave Lake continues to attract residents to the boreal forest, as it has always done.

APPENDIX A

Site Summaries

Table A1: Summary Attributes for Sites in Study Area[a]

Site	Terrace	Elevation	Context	Condition	No. of Shovel Pits	Positive Tests	Exc. Units	Artifact Classes	Comments
					North Shore Sites				
GiPx-3	2	2	2	1	3	3	1	1,2,3,4	Low Point site
GiQa-3	2	2	1,2	1,2	5	4	3	1,2,3	Slump site
GiQa-4	3	2	2	2	2	2	1	1,2,3	
GiQa-5	3	2	2	1	2	2	1	1,2,3	
GiQa-6	3	3	1,2	1,2	2	2	1	2	
GiQa-7	3	3	2	1	2	2	1	1	
GiQa-8	3	2	2	1	2	2	1	2	
GiQa-9	2	2	1	4	1	1	1	2	Campbell homestead (north)
GiQa-10	2	2	1,2	1,4	1	1	1	2	Campbell homestead (south)
GiQa-11	2	2	1,2	1,2	3	2	1	2,4	
GiQa-12	2	2	1	4	1	1	1	2	
GiQa-13	2	2	1	4	1	1	1	2	
GiQa-14	2	2	1	4	1	1	1	2	
GiQa-15	2	2	1	4	2	2	1	1,4	
GiQa-16	2	2	1	2,4	1	1	1	2	
GiQa-17	2	2	1,2	4	1	1	1	2,4	
GiQa-18	2	2	1	4	1	1	1	1,2,4	
GiQa-19	2	2	2	1	3	2	1	2	
GiQa-20	2	2	1	4	1	1	1	2	
GjPx-6	2	2	2	1	7	7	7	1,2,3,4	Hidden Creek
GjPx-7	2	2	2	1	3	2	1	2,3	
GjPx-8	2	2	2	1,4	2	2	1	2,3,4	2 pits hit hearths
GjPx-9	3	2	2	1	3	2	1	1,2	
GjPx-10	2	2	1,2	1,4	2	2	1	2,4	Findspots along a trail
GjPx-11	2	2	1,2	4	3	2	1	2	At mouth of unnamed creek
GjPx-12	2	2	1	1	3	2	1	2	
GjPx-13	3	2	1	1	3	2	1	1,2	
GiPv-2	3	2	2	1	2	2	1	2	
GiPv-3	2	2	2	1	2	2	1	2	
GiPv-4	2	2	2	1	4	2	1	2,4	
GiPv-5	2	2	2	1	4	2	1	2,3	
GiPv-6	2	2	2	1	3	2	1	2	
GiPv-7	2	2	2	1	3	2	1	2	
GiPu-1	3	2	1	4	2	1	1	2	
GiPu-2	3	2	1	4	1	1	1	2	
GjPt-1	3	2	1,2	4	6	3	1	2	Beacon Creek site

Table A1: Summary Attributes for Sites in Study Area[a] *(Continued)*

Site	Terrace	Elevation	Context	Condition	No. of Shovel Pits	Positive Tests	Exc. Units	Artifact Classes	Comments
GjPr-4	2	2	1,2	2	2	2	1	2,3	
GiPv-1	2	2	1,2	1	2	2	1	4	
South Shore Sites									
GiPx-1	2	2	1	4	1	1	1	2	
GiPx-2	3	2	1	4	1	1	1	1,2	
GiPu-3	2	2	1	2	1	1	1	2,4	
GhPv-1	2	2	1,3	3	1	1	1	2	Madsen site
GhPv-2		2	1,3	3	1	1	1	2	Strawberry Creek site
GhPv-3		2	1,3	3	1	1	1	2	
GiPs-3	2	3	1,2	1,4	2	2	1	2,3	
GiPs-4	2	2	1,2	1,4	3	2	1	2	
GiPr-17	2	3	2	4	1	1	1	2	
East Shore Sites									
GiPq-5	2	2	1	4	1	1	1	2	
GiPq-15		5	1	4	1	1	1	2	
Buffalo Bay Sites									
GjQa-3	3	3	1	4	1	1	1	2,4	2 THTC
GjQa-4	3	3	1	3	1	1	1	2	
GjQa-5	3	3	1,2	4	1	1	1	2,3	
GjQa-6	3	3	1	3	1	1	1	2	
GjQa-7	3	3	1	4	1	1	1	2	
South Heart River Sites									
GjQb-1	1	7	1	4	1	1	1	2	
GjQb-2	1	7	1	3	1	1	1	2	
GjQb-3	2	3	1	4	1	1	1	2	
GjQb-4	3	4	1	2,3	1	1	1	2	
GjQb-5	3	4	1	2,3	1	1	1	2,4	
GjQb-6	3	4	1	2,3	1	1	1	2	
GjQb-7	3	4	1	3	1	1	1	2	
GjQb-8	2	5	1	3,4	1	1	1	2	
GjQb-9	2	4	1	4	1	1	1	2	
GjQb-10	3	3	1	3,4	1	1	1	2	
GjQc-4	2	3	1	3	1	1	1	2	
GjQc-5	2	3	1	3	1	1	1	2,4	
GjQc-6	2	3	1	3	1	1	1	2	
GjQc-7	1	4	1	3	1	1	1	1,2	
GjQc-8	1	6	1,3	3	1	1	1	2,4	

Table A1: Summary Attributes for Sites in Study Area[a] *(Continued)*

Site	Terrace	Elevation	Context	Condition	No. of Shovel Pits	Positive Tests	Exc. Units	Artifact Classes	Comments
GjQc-9	1	7	1	4	1	1	1	2	
GjQc-10	1	6	1	4	1	1	1	2	
GjQc-11	1	3	1,3	3	1	1	1	2	
GjQc-12	3	3	1	3	1	1	1	2	
GjQc-13	3	3	1	3,4	1	1	1	2	
GjQc-14	3	3	1	3	3	1	1	2	
GjQc-15	3	4	1	3	1	1	1	2	
GjQc-16	3	5	1	3,4	1	1	1	2	
Other Sites									
GlPw-1	1	8	1	4	1	1	1	2	Gift Lake site
GlPv-1	1	8	1	3	1	1	1	2	Utikumasis Lake site
GkQb-1	1	8	1	3	1	1	1	2	Srhrynewick Field site
GjQa-8	1	8	3	4	1	1	1	2	Zuehlke Farm site

a.Code Definitions in Table A2

b.Tertiary Hills Tufaceous Clinker

Table A2: Code Definitions for Site Attributes

1. Site Number
2. Terrace
   - (a) Indeterminate
   - (b) First
   - (c) Second or higher
3. Elevation
   - (a) Indeterminate
   - (b) Lake level - 1900'
   - (c) 1901-1950'
   - (d) 1951-2000'
   - (e) 2001-2050'
   - (f) 2051-2100'
   - (g) 2101-2150'
   - (h) ≥ 2151'
4. Context
   - (a) Surface
   - (b) Buried
   - (c) Private collection
5. Condition
   - (a) Undisturbed
   - (b) Eroding
   - (c) Cultivated
   - (d) Construction, Recreational use, etc.
   - (e) N/A
6. No. of Shovel Tests
   - (a) None
   - (b) 1-5
   - (c) 6-10
7. No. of Positive Shovel Tests
   - (a) None
   - (b) 1-5
   - (c) 6-10
8. No. of Excavation Units
   - (a) None
   - (b) 1-5
   - (c) 6-10

Table A2: Code Definitions for Site Attributes *(Continued)*

9. Major Artifact Classes

(a) Fire-broken rock

(b) Lithics

(c) Faunal material

(d) Historic material

(e) N/A

Table A3: Summary of Material Classes by Site

Site	Chert	Quartzite	Pet. Wood	Jasper	Quartz	Obsidian	Other	Totals
				North Shore Sites				
GiPx-3		11						11
GiQa-3	698	6429	8	58	103	30	110	7436
GiQa-4		3						3
GiQa-5		3						3
GiQa-6	9	18			3		1 (slate)	31
GiQa-7		1						1
GiQa-8		1						1
GiQa-9		3						3
GiQa-10	1	45			1			47
GiQa-11		4						4
GiQa-12		1						1
GiQa-13	1	2						3
GiQa-14		2						2
GiQa-15	2	24	5					31
GiQa-16	6	42		2				50
GiQa-17	26	10						36
GiQa-18	63	23	18					104
GiQa-19	1	2						3
GiQa-20		2						2
GjPx-6	289	525	1		11		6	832
GjPx-7	1	1					1	3
GjPx-8	1							1
GjPx-9		3						3
GjPx-10	5	31						36
GjPx-11	2	6						8
GjPx-12		1						1
GjPx-13	1	1						2
GiPv-2	1	4						5

Table A3: Summary of Material Classes by Site *(Continued)*

Site	Chert	Quartzite	Pet. Wood	Jasper	Quartz	Obsidian	Other	Totals
GiPv-3	1	2						3
GiPv-4	2	5	7				1	15
GiPv-5	1	7						8
GiPv-6	1	1						2
GiPv-7	4							4
GiPu-1	3	9			8			20
GiPu-2	6	11						17
GjPt-1	42	100	4		12		2 (KRF?)[a]	160
GjPr-4	6	55						61
Subtotals	1173	7388	43	60	138	30	121	8953
				South Shore Sites				
GiPx-1	2	5						7
GiPx-2		5						5
GiPu-3		10						10
GhPv-1	6	61			1		1 (THTC)[b]	69
GhPv-2	5	39		1	1			46
GhPv-3	1	15			2			18
GiPs-3		9						9
GiPs-4		3						3
GiPr-17		3						3
Subtotals	14	150	1		4		1	170
				East Shore Sites				
GiPq-5		14						14
GiPq-15	2	20						22
Subtotals	2	34						36
				Buffalo Bay Sites				
GjQa-3	1	3			1		3 (2 THTC)	8
GjQa-4	2	3						5
GjQa-5	2	10			5		2	19
GjQa-6	8	18			3		1	30
GjQa-7		1						1
Subtotals	13	35			9		6	63
				South Heart River Sites				
GjQb-1	2	1						3
GjQb-2		1						1
GjQb-3	1	3						4
GjQb-4	4	4			3			11

Table A3: Summary of Material Classes by Site *(Continued)*

Site	Chert	Quartzite	Pet. Wood	Jasper	Quartz	Obsidian	Other	Totals
GjQb-5	1	5			4			10
GjQb-6	5	1						6
GjQb-7	1	2					1	4
GjQb-8	3	1						4
GjQb-9	1	1						2
GjQb-10	1							1
GjQc-4	4	3						7
GjQc-5	235	185	2		49		24	495
GjQc-6	75	59			14		5	153
GjQc-7	4	5			1			10
GjQc-8	1	3						4
GjQc-9	1	1						2
GjQc-10		1					1	2
GjQc-11	2	7		1			1	11
GjQc-12	2							2
GjQc-13	3	8			1			12
GjQc-14	27	39	1		5	1	4	77
GjQc-15	3	1			1			5
GjQc-16	1	3			2			6
Subtotals	377	334	3	1	80	1	36	832
				Other Sites				
GlPw-1	11	32					1	44
GlPv-1	1	1						2
GkQb-1	1	5						6
GjQa-8		1						1
GhPp-1		15						15
Subtotals	13	54					1	68
Grand Totals	1592	7995	47	61	231	31	165	10122

Table A4: Summary of Artifact Classes by Site

Site	Cores	Flakes & Shatter	Spalls	Mod. Flakes	Mod. Spalls	Mod. Pebbles & Cobbles	Scrapers	Pièces Esquillées	Anvils	Hammerstones	Abraders	Bifaces	Projectile Points	Mod.Bone/Antler	Historic	Ochre	Mod. Fire-broken rock	Faunal Material	Misc.	Comments	Totals[a]
North Shore Sites																					
GiPx-3	1	5	2			1				2					2			5			18
GiQa-3	57	1122	35	8	7	7	6	8	6	8		9							10	Slump site - 1980 collection	1283
GiQa-3	245	5463	127	93	73	157	35	17	15	29	3	22	9	10		18	714	3840	20	Slump site - 1988-90 collection	10870
GiQa-4		3																1			4
GiQa-5		2																3			5
GiQa-6		28			1			1											1		31
GiQa-7		1																			1
GiQa-8	1																				1
GiQa-9	1	2																			3
GiQa-10	6	32	2		4		1	1		1					2						49
GiQa-11		3			1																4
GiQa-12	1																				1
GiQa-13	1	1			1																3
GiQa-14	1				1																2
GiQa-15	6	16	5	1	2							1			5						36
GiQa-16	10	18	14		5							2			4				1		54
GiQa-17	2	29	1	2				2													36
GiQa-18	1	93	1	3	1			1				1			13						114
GiQa-19	1	2																			3
GiQa-20	1											1									2
GjPx-6	27	692	10	36	11	2	24	7	3	3		4	3		18			1295	10	Hidden Creek site	2145
GjPx-7	1	1										1						5			8
GjPx-8		1													2			122			125
GjPx-9		2	1																		3
GjPx-10	5	21	7	1	1		1														36

Table A4: Summary of Artifact Classes by Site (Continued)

Site	Cores	Flakes & Shatter	Spalls	Mod. Flakes	Mod. Spalls	Mod. Pebbles & Cobbles	Scrapers	Pièces Esquillées	Anvils	Hammerstones	Abraders	Bifaces	Projectile Points	Mod.Bone/Antler	Historic	Ochre	Mod. Fire-broken rock	Faunal Material	Misc.	Comments	Totals
GjPx-11	1	6						1													8
GjPx-12					1																1
GjPx-13	1																		1		2
GiPv-1															30						30
GiPv-2	2	1																39			42
GiPv-3	2	1																			3
GiPv-4	1	12		1											1			8			23
GiPv-5		8																3			11
GiPv-6		2																			2
GiPv-7		4																			4
GiPu-1	1	18		1																	20
GiPu-2	2	14					1														17
GjPt-1	9	136	6	4			1														156
GjPr-4	4	53	3			1									17						78
Subtotals	391	7792	214	150	109	168	69	38	24	43	3	41	12	10	94	18	682	6193	43		15234
												South Shore Sites									
GiPx-1	1	4	1									1									7
GiPx-2		5																			5
GiPu-3	3	2	2		1		1					1			5						15
GhPv-1	1	26	8	2	6		1			1		24			1				2	Madsen site: 1 flake of Tertiary Hills tufaceous clinker; 1 jadeite adze, 1 steatite pipe	72
GhPv-2	1	34	8	1			1					1			1						46
GhPv-3		9	3		2		1					3			7						25
GiPs-3		6	3		1													26			36
GiPs-4		2					1											4			7

Table A4: Summary of Artifact Classes by Site (Continued)

Site	Cores	Flakes & Shatter	Spalls	Mod. Flakes	Mod. Spalls	Mod. Pebbles & Cobbles	Scrapers	Pièces Esquillées	Anvils	Hammerstones	Abraders	Bifaces	Projectile Points	Mod.Bone/Antler	Historic	Ochre	Mod. Fire-broken rock	Faunal Material	Misc.	Comments	
GiPr-17		2	1																		3
Subtotals	6	90	26	3	10		5			1		30			14			30	2		217
										East Shore Sites											
GiPq-5	1	5	7	1																	14
GiPq-15		20		2																	22
Subtotals	1	25	7	3																	36
										Buffalo Bay Sites											
GjQa-3		6		1			1								2					2 flakes of Tertiary Hills tufaceous clinker	10
GjQa-4		4					1														5
GjQa-5	1	11	3	2	1							1			2			1			22
GjQa-6		26	2	1			1												1		31
GjQa-7		1																			1
Subtotals	1	48	5	4	1		3					1			4			1	1		69
										South Heart River Sites											
GjQb-1		3																			3
GjQb-2							1														1
GjQb-3	1	1	1									1									4
GjQb-4	1	9					1														11
GjQb-5		9		1											1						11
GjQb-6	1	3		1				1													6
GjQb-7	1	2					1														4
GjQb-8		3					1														4
GjQb-9		1	1																		2
GjQb-10		1																			1
GjQc-4	1	4		2																	7

Table A4: Summary of Artifact Classes by Site (Continued)

Site	Cores	Flakes & Shatter	Spalls	Mod. Flakes	Mod. Spalls	Mod. Pebbles & Cobbles	Scrapers	Pièces Esquillées	Anvils	Hammerstones	Abraders	Bifaces	Projectile Points	Mod.Bone/Antler	Historic	Ochre	Mod. Fire-broken rock	Faunal Material	Misc.	Comments	Totals
GjQc-5	89	289	4	60	3		26	2		2		15	5		7					copper pot; .45-70-405 shell; 1 bottle neck	502
																					154
GjQc-6	11	103	3	14	4		12	1				5			1						10
GjQc-7	2	5	1	2											5					trade knife	9
GjQc-8		3			1																2
GjQc-9		2																			2
GjQc-10		1			1																11
GjQc-11	1	5		2	2		1														2
GjQc-12		1		1																	12
GjQc-13			9				2					1									
GjQc-14	5	42	1	8	2		4	1				4	1						1	notched stem obsidain point; bit of ground adze	69
													1		1						6
GjQc-15	1	3																			6
GjQc-16	4	2																			839
Subtotals	118	492	20	91	13		49	5			2	26	7		15				1		
Other Sites																					
																		5			49
GlPw-1	2	35	3	2			2														2
GlPv-1		2																			6
GkQb-1		3	1	1			1														15
GhPp-1	7	3	3				1					1									1
GjQa-8		1																			73
Subtotals	9	44	7	3			4					1						5			
Totals	526	8491	279	254	133	168	130	43	24	43	5	99	19	10	127	18	682	6209	47		16467

a. Totals based on pre-analysis catalogue counts; some discrepancies may exist for GjPx-6 and GiQa-3

APPENDIX B

Historic Period Features at Big Point

The following summary provides brief descriptions of standing structures on Big Point, Lesser Slave Lake. The remains date to the first half of the 20th century. Figure B1 shows a aerial view of most of the clearing where the buildings are located. The log house (structure 8) is located on the east end of the clearing; the depressions on the west end. Figure B2 shows a ground view from the west end of the clearing looking east.

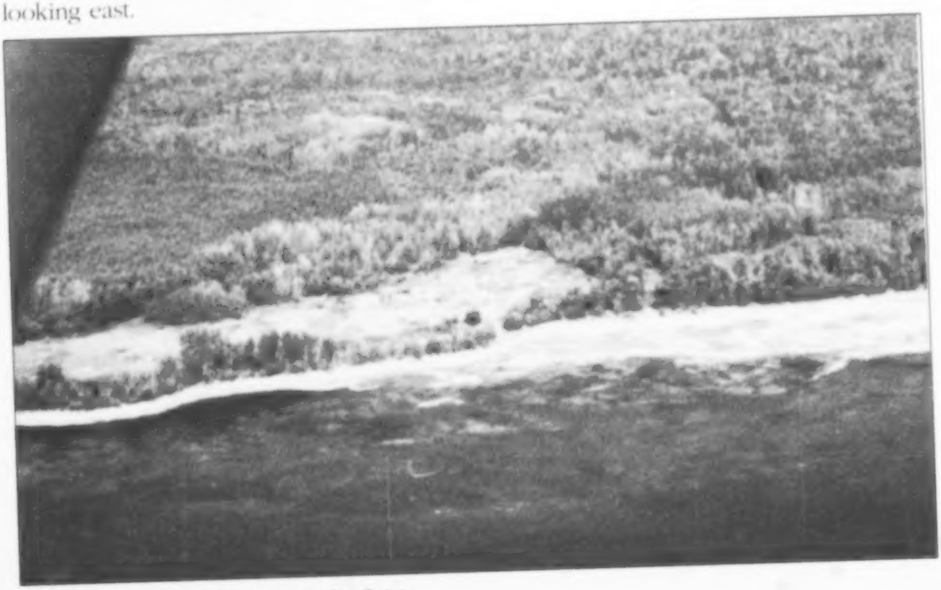


Figure B1: Aerial View of Clearing at Big Point

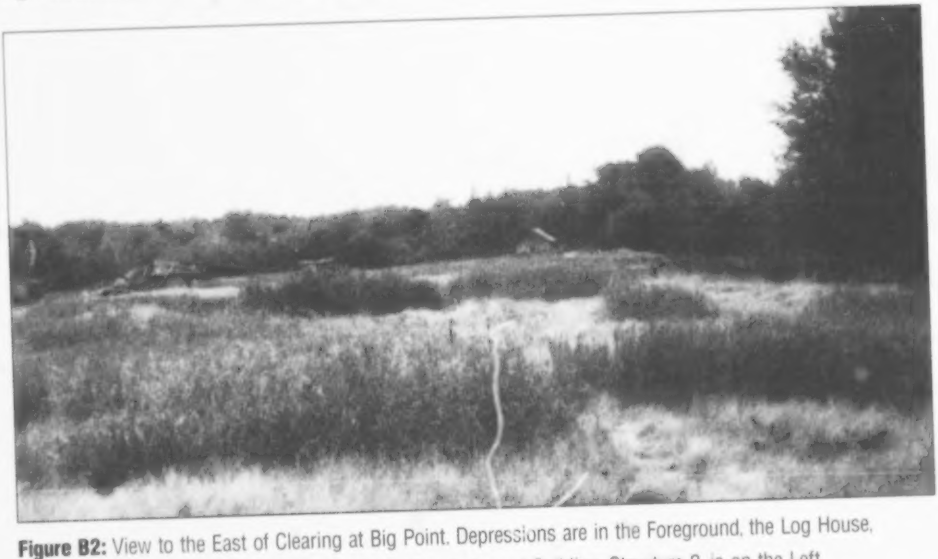
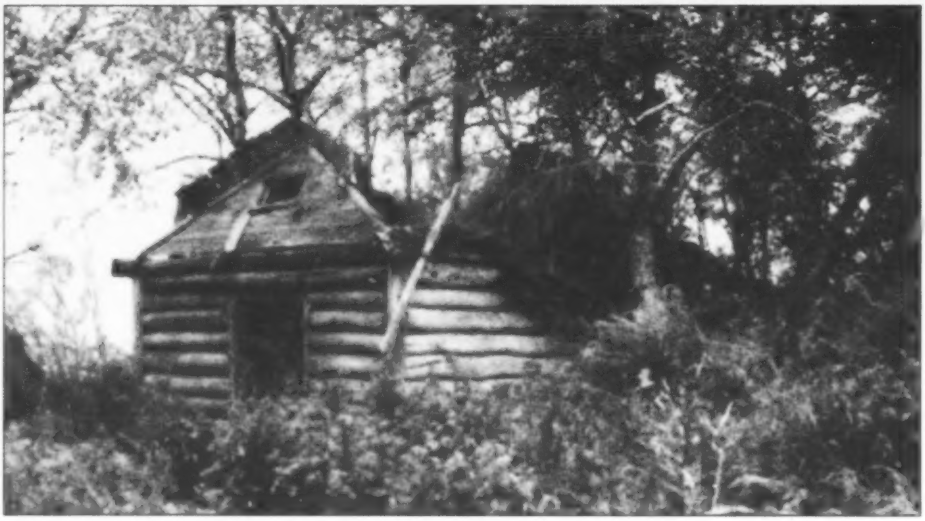
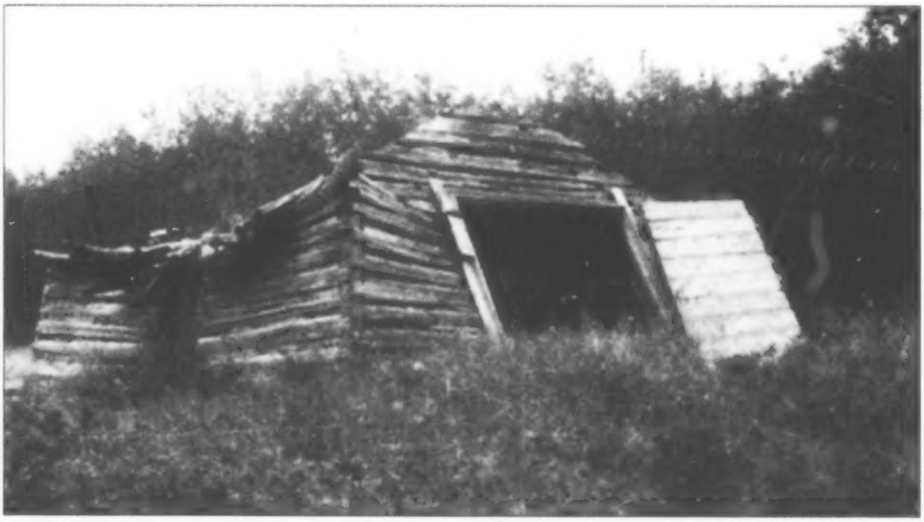


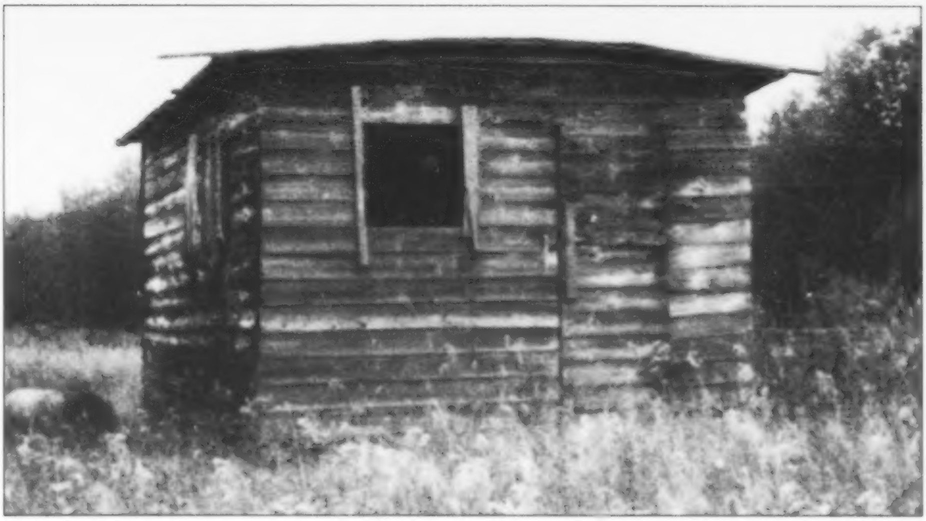
Figure B2: View to the East of Clearing at Big Point. Depressions are in the Foreground, the Log House, Structure 8, is in the Background on the Right. The Collapsed Building, Structure 2, is on the Left



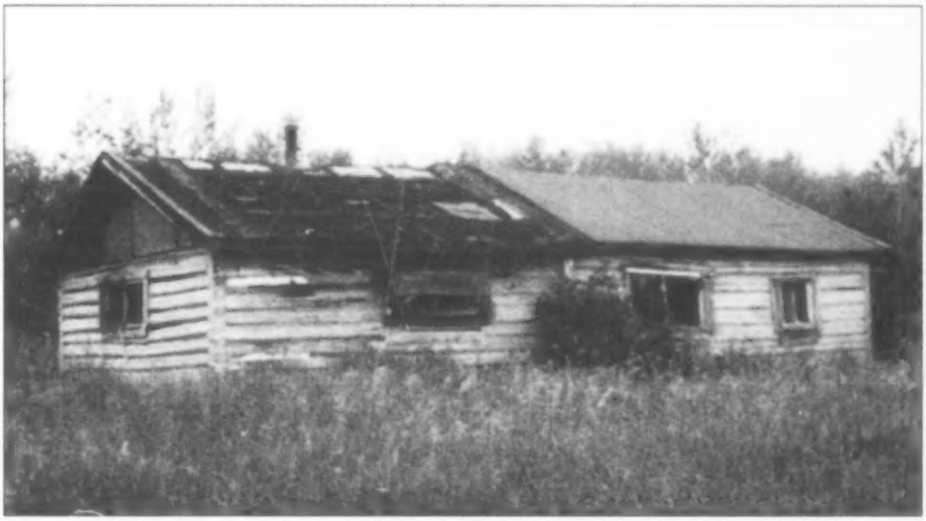
Structure 1, Ice House (?). Located at the base of the first terrace, along the lake shore. Round log construction, with logs nailed to boards at the corners; chinked with clay. Gables and roof of boards supported by longs and poles. Roof is collapsed. Dimensions: 4.8 m wide, 5 m long. This building was identified by a local informant as an ice house, for preservation of fish. Dimensions: 4.8 m wide, 5 m long.



Structure 2. A shed or barn (?), constructed with squared logs that are dovetailed at the corners and chinked with a mixture of clay and grass. The roof consists of a log framework, with a covering of slender poles and a layer of earth on top of the poles. Dimensions: 5.66 m long, 5.54 m. wide.



Structure 3. Small storage (?) shed constructed of 2x4' lumber. Roof has curved pitch. Building looks like it was built on skids. Contains numerous fish nets, floats, and other fishing paraphernalia. Dimensions: 4.93 m long, 3.69 m wide.

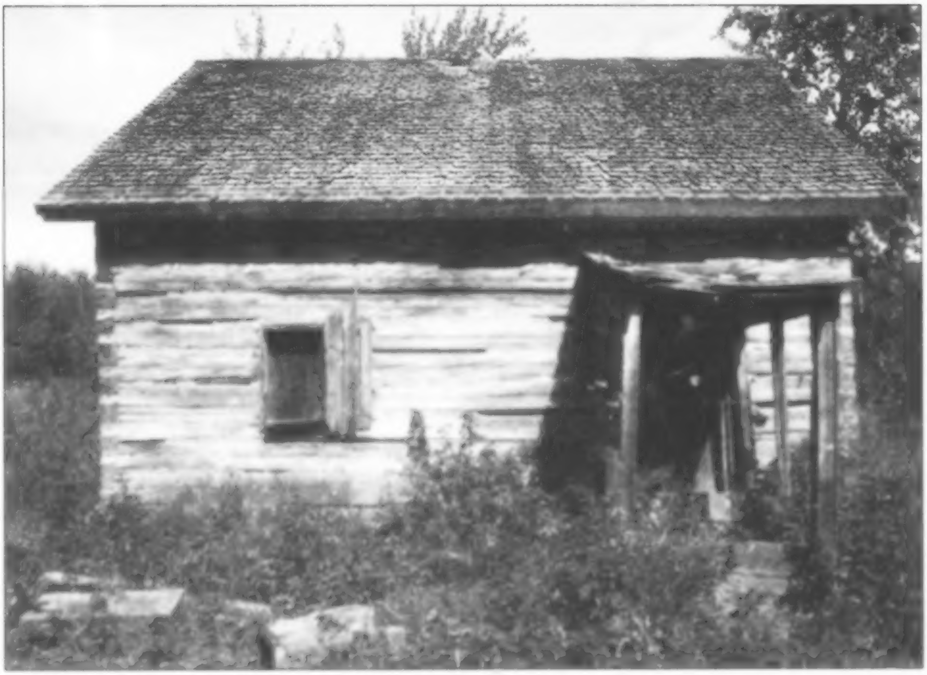


Structure 4. House of squared log construction with dovetailed corners. The east annex/entrance is made of rough sawn lumber and 2x4s. The roof of the main house is constructed of logs with a covering of rough sawn lumber; the latter extends from the eaves to the peak. Roofing consists of asphalt shingles, black on west half, green on the east. Chinking is a grass/clay mixture. There may have been a door in the eastern half of the main house, which was later filled in to create a window. The interior has exposed log walls, but there is a ceiling of 3" tongue and groove lumber

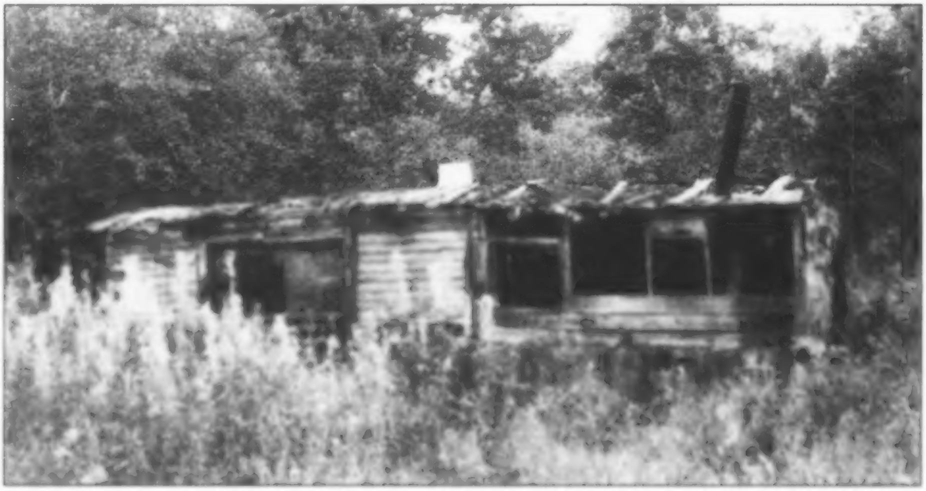
running east-west along the long axis of the building. Dimensions: 11.19 m along south wall of log-built portion of building. Annex is 1.84 m long, 3.05 m wide. There are two privies behind this house.

Structure 5. Located south of structure 4, constructed of 2x4s and boards, all rough sawn. The roof is constructed of boards extending from the eaves to the peak. There appears to have been a second layer of boards nailed over the first. The presence of a cook stove inside, suggests the building was a residence. Dimensions: 3.74 m long, 3.17 m wide.

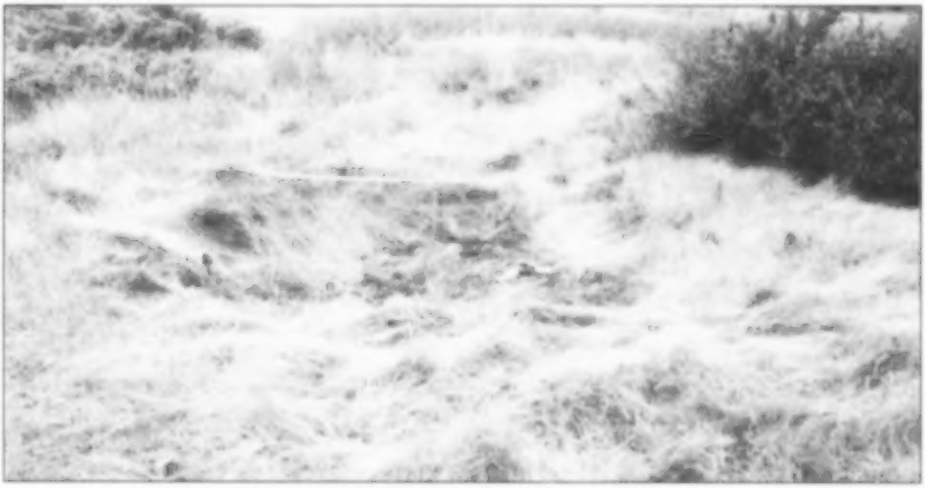
Structure 6. A stable (located NE of #4) constructed of round logs with 2x8' boards for the corners. Log beams were used for the roof superstructure; rough sawn boards (about 6 inches wide) of at least one inch thick or more were used for the roof covering. Chinked mainly with moss, though some clay/moss was also used. Dimensions: 5.59 m long, 4.76 m long.



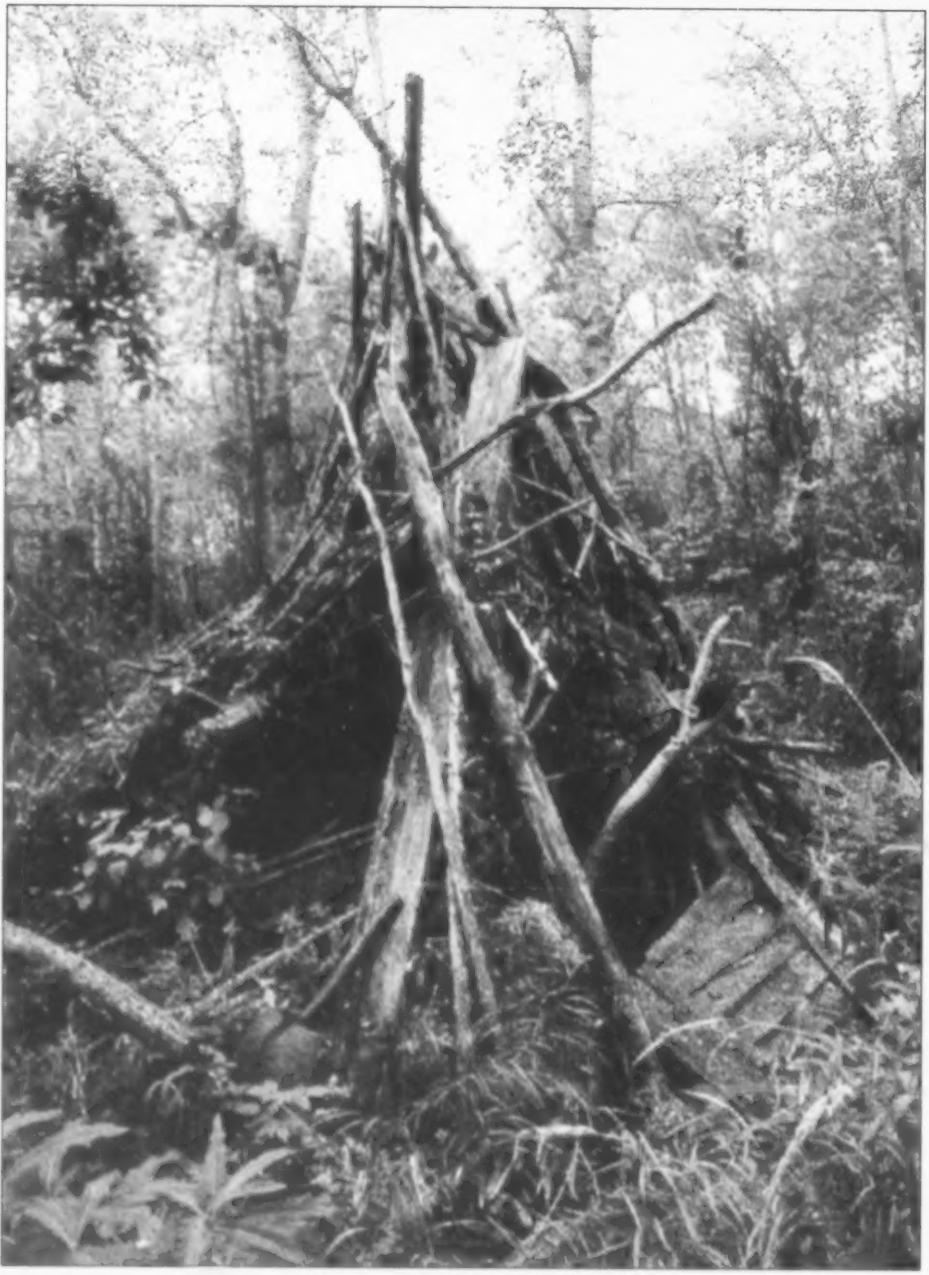
Structure 7. A two storey, squared log house with dovetailed corners, chinking of clay/moss mixture. The entrance on the south side is built of 2x4s and boards; the roof is made of rough sawn 2x4s and covered by 1x6" boards running end to end instead of from eave to peak, as in other buildings. The roof is covered with what appear to be cedar shingles. The second floor is made of 1x6" boards running end to end, with no central supports. Stairs ascend the east wall. There is a small root cellar in the centre of the main floor. There are no interior partitions. A white wash/covering made of clay still adheres to the upper three courses of logs on the north wall, the upper two on the south wall and on portions of the caulking on the east wall; there is none on the west wall. There is a cook stove, kitchen cupboards and other miscellaneous items inside. Dimensions: 6.14 m long (north wall), 6.17 m wide (west wall).



Structure 8. A small residence of 2x4s and rough sawn boards; the roof has a curved pitch, and is built of 2x6s and 2x8s and 1x3 boards; it is covered with tar paper. A bed and stove occupies the interior. Dimensions: 6.53 m long, 3.1 m wide.



House Depression. At the west end of the Big Point clearing, there are two depressions adjacent to one another. The west and larger of the two is approximately 5.7 m square and 1 m deep. Another smaller, shallower depression appears to join the larger one along the east wall. This depression is 5.2 m along the south wall and 4.7 m along the east. There are no visible structural remains. A single shovel test pit was placed in the west pit. It produced a medium-sized leg-hold trap, a small calibre cartridge, several pieces of large mammal faunal material, and various pieces of historic period trash.



Sweat Lodge (?). Located behind structure 6. Approximately 2.5 m high, and 2 m in diameter. A galvanized wash tub, located inside, contained burned quartzite cobbles.

ENDNOTES

Chapter 1
Page 1 1. Now Alberta Community Development, Cultural Facilities and Historical Resources Division, Heritage Resource Management Branch, Archaeology and History Section.

Chapter 1
Page 6 2. Also written Tittimeg. This is a reference to Arctic Grayling (*Thymallus arcticus*); Scott and Crossman 1973:305.

Chapter 1
Page 7 3. Detailed results of the report were kept confidential under an agreement with the elder.

Chapter 2
Page 9 4. Canadian Heritage Information Network

Chapter 2
Page 20 5. That is, .45 calibre, 70 grains of black powder, and a 405 grain bullet. This cartridge type was introduced in the late 19th century and is still used today.

Chapter 3
Page 38 6. Copy of a section of the map courtesy of Bruce Ball, Altamira Consulting Limited, Edmonton.

Chapter 3
Page 92 7. Weights of individual specimens were not recorded systematically. However, the 1989 collection, which included 2,708 bones, weighed just 800.3g

WORKS CONSULTED

Alberta Indian Development Systems

n.d. *Lesser Slave Lake Study*. Edmonton.

Alberta Land Inventory

n.d. *Sport Fish Capability, Lesser Slave Lake, 83/0*. Alberta Environment.

Ames, Kenneth M., and Herbert D.G. Maschner

1999 *Peoples of the Northwest Coast, Their Archaeology and Prehistory*. Thames and Hudson. London

Anderson, Douglas D.

1968 A Stone Age Campsite at the Gateway to America. *Scientific American* 218(6):24-33.

1988 Onion Portage: The Archaeology of a Stratified Site from the Kobuk River, Northwestern Alaska. *Anthropological Papers of the University of Alaska* 27(1-2).

Archaeological Society of Alberta

n.d. Peace Past Project: An Archaeological Survey of the Peace River District. Peace River Archaeological Society.

Babcock, D.R.

n.d. Lesser Slave Lake: a Regional History. Report on file, Archaeological Survey, Provincial Museum of Alberta. Edmonton.

Baergren, P.

1967 The Fur Trade at Lesser Slave Lake, 1815-1831. Unpubl. M.A. Thesis, Department of History, University of Alberta. Edmonton.

Bailey, J.

1995 X-Ray Fluorescence Analysis of Four Obsidian Artifacts From Archaeological Site GiQa-3, Lesser Slave Lake, Alberta. Report in possession of R. Le Blanc.

Bereziuk, D. A.

2001 The Smuland Creek Site and Impliications for Palaeoindian Site Prospection in the Peace Region of Northwestern Alberta. In *Sovremeniye Problemiy Evraziyskovo Paleolitovedeniya (Modern Problems in Eurasian Palaeolithic)*, ed. by A.P. Derevianko and G.I. Medvedev, pp. 382-402. Institute of Archaeology and Ehtnography. Novosibirsk.

Bertulli, Margaret and Claus Andreasen

1992 *Archaeological Field Work in the Northwest Territories, Canada and Greenland in 1991*. Archaeology IReport No. 11. Prince of Wales Northern Heritage Centre. Yellowknife.

Bertulli, Margaret and Joel Berglund

1993 *Archaeological Field Work in the Northwest Territories, Labrador and Arctic Quebec, Canada and Greenland in 1992*. Archaeology Report No. 13. Prince of Wales Northern Herittage Centre. Yellowknife.

Binford, L.R. and G. Quimby

1963 Indian Sites and Chipped Stone Materials in the Northern Lake Michigan Area. ***Fieldiana Anthropology*** 36:277-307.

Birket-Smith, Kaj

1958 Boulder-chip Scrapers in the Eastern Arctic. ***Man*** 158(157):113-114.

Bonnichsen, Robson

1979 ***Pleistocene Bone Technology in the Beringian Refugium.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 89. Ottawa.

Bowers, P.M., R.Bonnichsen, and D.M. Hoch

1983 Flake Dispersal Experiments: Noncultural Transformation of the Archaeological Record. ***American Antiquity*** 45(3):553-572.

Bryan, Alan and Gerald Conaty

1975 A Prehistoric Athapaskan Campsite in Northwestern Alberta. ***Western Canadian Journal of Archaeology*** 5 (3-4):64-91.

Brumley, John H.

1975 ***The Cactus Flower Site in Southeastern Alberta: 1972-1974 Excavations.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 46. Ottawa.

Bugera, A.

n.d. Possible Taphonomic Processes that May Have Acted on the Deposits of the Slump Site, GiQa-3, Lesser Slave Lake, Alberta. Report on file, Department of Anthropology, Univ. of Alberta, Edmonton.

Carlson, Roy L.

1994 Trade and Exchange in Prehistoric British Columbia. In ***Prehistoric Exchange Systems in North America***, ed. by T.G. Baugh and J.E. Ericson, pp. 307-361. Plenum Press: New York.

Cinq-Mars, Jacques

1973a An Archaeologically Important Raw Material from the Tertiary Hills, Western District of Mackenzie, Northwest Territories: A Preliminary Statement. Appendix E. ***Preliminary Archaeological Study: Mackenzie Corridor***. Environmental-Social Committee, Northern Pipelines Task Force on Northern Oil Development, Report No. 73-10. Ottawa.

1973b A propos de la signification archéologique d'un matériau découvert dans la région de la rivière Keele (T.N.O.). ***Association Canadienne d'Archéologie, Bulletin*** no. 5, pp. 1-25.

Clark, D.W.

1987 ***Archaeological Reconnaissance at Great Bear Lake.*** Canadian Museum of Civilization Mercury Series, Archaeological Survey of Canada, Paper No. 136. Hull.

Collins, Michael B.

1999 *Clovis Blade Technology*. University of Texas Press. Austin.

Conaty, Gerald

1973 The Karpsinsky Site. B.A. (Honours) Thesis. Department of Anthropology, University of Alberta. Edmonton.

1977 Excavations at Wentzel Lake. In *Archaeology in Alberta, 1976*, ed. by J. Michael Quigg, pp. 31-36. Archaeological Survey of Alberta, Occasional Paper No. 4. Edmonton.

1978 The Wentzel Lake Site: a Stratified Prehistoric Archaeological Site in the Caribou Mountains, Northern Alberta. MA thesis. Department of Anthropology, Memorial University of Newfoundland. St. John's.

Connor Learn, Kathleen

1983 The Black Fox Island Project. End-of-Season Report, Permit 82-66. In *Archaeology in Alberta, 1982*, ed by David Burley, 124-133. Archaeological Survey of Alberta, Occasional Paper No. 21. Edmonton.

1986 Pottery and Prehistory of Black Fox Island: Technical Patterns in a Cultural Perspective. MA thesis, Department of Anthropology, University of Alberta. Edmonton.

Cooper, J.M.

1938 *Snares, Deadfalls, and Other Traps of the Northern Algonquians and Northern Athapaskans*. Catholic University of American Anthropological Series 5. Washington, D.C.

Craig, J. and L. Mutch

n.d. Modified Fire-Broken Rock Replications at GiQa-3. Paper for Anthropology 396, June 1989, on File. Department of Anthropology, University of Alberta. Edmonton.

Cziesla, E.

1990 On Refitting of Stone Artefacts. In *The Big Puzzle. International Symposium on Refitting Stone Artefacts*, ed. by E. Cziesla, S. Eichkhoff, N. Arts, and D. Winter, pp. 9-44. Studies in Modern Archaeology, No. 1. Bonn.

Cziesla, E., S. Eichkhoff, N. Arts and D. Winter (eds.)

1990 *The Big Puzzle. International Symposium on Refitting Stone Artefacts*. Studies in Modern Archaeology, No. 1. Bonn.

Dawe, Bob

1984 An Experiment in the Thermal Pretreatment of Quartzite. In *Archaeology in Alberta 1983*, ed. by David Burley, pp. 137-152. Archaeological Survey of Alberta, Occasional Paper No. 23. Edmonton.

1987 The Triangular Projectile Point in Plains Prehistory: A Preform Trade Hypothesis. In *Archaeology in Alberta 1986*, compiled by M. Magne, pp. 150-162. Archaeological Survey of Alberta, Occasional Paper No. 31. Edmonton.

1997 A Unique Fluted Point from the Grande Prairie Region. ***Alberta Archaeological Review*** 25:12-14.

Dawson, G.M.

1881 Report on an Exploration from Port Simpson on the Pacific Coast, to Edmonton on the Saskatchewan, Embracing a Portion of the Northern Part of British Columbia and the Peace River Country 1879. ***Reports of Explorations and Surveys, 1879-80.*** Geological and Natural History Survey of Canada. Ottawa.

Deck, K. and J. Martin

n.d. MFBR: Fact or Fiction. Paper for Anthropology 396, June 1990, on File, Department of Anthropology, University of Alberta. Edmonton.

Delpech, François and Jean-Phillippe Regaud

1974 Étude de la fragmentation et de la répartition des restes osseux dans un niveau d'habitat paléolithique, ed. by Henriette Camps-Fabrer, pp. 47-55. In ***L'industries de l'os dans la préhistoire.*** Éditions de l'université de Provence

Dewhirst, John

1980 ***The Yuquot Project Volume I. The Indigenous Archaeology of Yuquot, a Nootkan Outside Village.*** History and Archaeology 39. Parks Canada. Ottawa.

Doll, Maurice F.V.

1982 ***The Boss Hill Site (FdPe-4) Locality 2: Pre-Archaic Manifestations in the Parkland of Central Alberta,*** Canada. Provincial Museum of Alberta Human History Occasional Paper 2. Edmonton.

Donahue, Paul

1976a Alberta North. In ***Archaeology in Alberta, 1975,*** ed. by J. Michael Quigg and W.J. Byrne, pp. 42-50. Archaeological Survey of Alberta, Occasional Paper No. 1. Edmonton.

1976b ***Research in Northern Alberta, 1975.*** Archaeological Survey of Alberta, Occasional Paper No. 2. Edmonton.

1977 Prehistoric Relationships between the Plains, Boreal Forest and Cordilleran Regions. In ***Prehistory of the North American Subarctic: The Athapaskan Question,*** ed. by J.W. Helmer, S. Van Dyke and F.J. Kense, pp. 83-89. Proceedings of the 9th Annual Conference, The Archaeological Association of the University of Calgary. Calgary.

Dyck, Ian G.

1977 ***The Harder Site, a Middle Period Bison Hunters' Campsite in the Northern Great Plains.*** National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 67. Ottawa.

1983 ***The Prehistory of Southern Saskatchewan. In Tracking Ancient Hunters: Prehistoric Archaeology in Saskatchewan***, ed. by H.T. Epp and I. Dyck, pp. 63-139. Saskatchewan Archaeological Society. Regina.

Ellis, C.

1997 Factors Influencing the Use of Stone Projectile Tips: an Ethnographic Perspective. In ***Projectile Technology***, ed., by Heidi Knecht, pp. 37-74. Plenum Press. New York.

Esdale, Julie

2001 ***Geoarchaeological Studies at the Dog Creek Site, Northern Yukon.*** Heritage Branch, Government of the Yukon, Hudē Hudān Series, Occasional Papers in Archaeology No. 9. Whitehorse.

Esdale, Julie, R.J. Le Blanc, and J. Cinq-Mars

2001 Periglacial Geoarchaeology at the Dog Creek Site, Northern Yukon. ***Geoarchaeology*** 16(2):152-176.

Eyman, F.

1968 The Teshoa, a Shoshonean Woman's Knife: a Study of American Indian Chopper Industries. ***Pennsylvania Archaeologist,***Vol. XXXIV(3-4)

Fedirchuk, Gloria J.

1980 Final Report, Historical Resources Impact Assessment Lesser Slave Lake Provincial Park. Final Report for Permit 80-178C. On file, Archaeological Survey, Provincial Museum of Alberta. Edmonton.

1981 Historical Resources Impact Assessment, Lesser Slave Lake Provincial Park, Permit 80-178-C. In ***Archaeology in Alberta 1980***, ed. by Jack Brink, pp. 84-88. Archaeological Survey of Alberta, Occasional Paper No. 17. Edmonton.

Fisher, T.G.

1993 Glacial Lake Agassiz: The Northwest Outlet and PaleoFlood Spillway, N.W. Saskatchewan and N.E. Alberta. PhD thesis, University of Calgary. Calgary.

Fisher, T.G. and D.G. Smith

1994 Glacial Lake Agassiz: Its Northwest Maximum Extent and Outlet in Saskatchewan (Emerson Phase). ***Quaternary Science Reviews*** 13:845-858.

Fisher, T.G. and Souch, C.

1998 Northwest Outlet Channels of Lake Agassiz, Isostatic Tilting and a Migrating Continental Drainage Divide, Saskatchewan, Canada. ***Geomorphology*** 25:57-73.

Fladmark, K.R

1981 Paleo-Indian Artifacts from the Peace River District. ***BC Studies*** 48:124-156.

Fladmark, K.R., J.C. Driver and D. Alexander

1988 The Paleoindian Component at Charlie Lake Cave (HbRf-39), British Columbia. ***American Antiquity*** 53(2):371-384.

Forbis, Richard G.

1970 ***Review of Alberta Archaeology to 1964.*** National Museums of Canada, Publications in Archaeology No. 1. Ottawa.

French, Diana E.

1979 Final Report, Lesser Slave Lake Canal and Weir Project. Final report for Permit #79-90. On file, Archaeological Survey, Provincial Museum of Alberta. Edmonton.

1980 Historical Resources Impact Assessment of the Canal and Weir, Lesser Slave Lake, Alberta, Permit Number 79-90. In ***Archaeology in Alberta, 1979,*** ed. by P.F. Donahue, pp. 75-80. Archaeological Survey of Alberta, Occasional Paper No. 15. Edmonton.

Frison, George C.

1991 ***Prehistoric Hunters of the High Plains.*** Second Edition. Academic Press. New York.

Gillespie, Beryl C.

1981 Territorial Groups before 1821: Athapaskans of the Shield and the Mackenzie Drainage. In ***Handbook of North American Indians, Volume 6, Subarctic,*** ed. by June Helm, pp. 161-168. Smithsonian Institution. Washington, D.C.

Gordon, B.C.

1976 ***Migod–8,000 Years of Barrenland Prehistory.*** National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 56. Ottawa.

1977 Temporal, Archaeological and Pedological Separation of the Barrenland Arctic Small Tool and Taltheilei Traditions. In ***Prehistory of the North American Subarctic: The Athapaskan Question,*** ed. by J.W. Helmer, S. Van Dyke, and F.J. Kense, pp. 77-82. Proceedings of the 9th Annual Chacmool Conference, Chacmool, the Archaeological Association of the University of Calgary. Calgary.

1996 ***People of the Sunlight, People of the Starlight: Barrenland Archaeology in the Northwest Territories of Canada.*** Canadian Museum of Civilization Mercury Series, Archaeological Survey of Canada, Paper No. 154. Hull.

Gotthardt, R.M.

1990 ***The Archaeological Sequence in the Northern Cordillera: A Consideration of Typology and Traditions.*** Heritage Branch, Government of the Yukon. Hudē Hudān Series, Occasional Papers in Archaeology No. 1. Whitehorse.

Green, F.E.

1963 The Clovis Blades: an Important Addition to the Llano Complex. ***American Antiquity*** 29(2):145-165.

Gruhn, Ruth

1971 Preliminary Report on the Muhlbach Site: A Besant Bison Trap in Central Alberta. In ***Contributions to Anthropology VII: Archaeology and Physical Anthropology***, pp. 128-156. National Museum of Man, Bulletin 232. Ottawa.

1981 ***Archaeological Research at Calling Lake, Northern Alberta***. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 99. Ottawa.

Gryba, Eugene

1985a Evidence of the Fluted Point Tradition in Alberta. In ***Contributions to Plains Prehistory***, ed. by David V. Burley, pp. 22-38. Archaeological Survey of Alberta, Occasional Paper No. 26. Edmonton.

1985b Evidence of the Fluted Point Tradition in Alberta. ***Alberta Archaeology Review*** 11:3-11.

1988 An Inventory of Fluted Point Occurrences in Alberta. Report on file, Archaeological Survey of Alberta. Edmonton.

Hayden, B.

1980 Confusion in the Bipolar World: Bashed Pebbles and Splintered Pieces. ***Lithic Technology*** IX(1):2-7.

Haynes, C.V.

1982 Were Clovis Progenitors in Beringia? In ***Paleoecology of Beringia***, ed. by D.M. Hopkins, J.V. Matthews, C.E. Schweger, and S.B. Young, pp. 383-398. Academic Press. New York.

Helm, June (ed.)

1981 ***Handbook of North American Indians, Vol. 6, Subarctic***. Smithsonian Institution. Washington, D.C.

Holmes, C.E.

1986 ***Lake Minchumina Prehistory an Archeological Analysis***. Alaska Anthropological Association, Aurora No. 2. Anchorage.

Holmes, C.E., R. VanderHoek, and T.E. Dilley

1996 Swan Point. American Beginnings: ***The Prehistory and Palaeoecology of Beringia***, ed. by F.H. West, pp. 319-322. The University of Chicago Press. Chicago.

Horetzsky, Charles

1874 ***Canada on the Pacific: A Journey from Edmonton to the Pacific by the Peace River Valley***. Dawson Brothers. Montreal.

Inglis, Richard

1976 'Wet' Site Distribution — *the Northern Case GbTo 33 — the Lanchane Site*. In *The Excavation of Water-Saturated Archaeological Sites (Wet Sites) on the Northwest Coast of North America*, ed. by Dale R. Croes, pp. 158-185. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 50. Ottawa.

Isaac, Glynn Ll.

1977 *Olorgesailie: Archaeological Studies of a Middle Pleistocene Lake Basin in Kenya.* The University of Chicago Press. Chicago.

Ives, John W.

1977 The Excavation of HkPa4, Birch Mountains, Alberta. In *Archaeology in Alberta, 1976*, ed. by J. Michael Quigg, pp. 37-44. Archaeological Survey of Alberta, Occasional Paper No. 4. Edmonton.

1981a Birch Mountain Archaeological Study, 1980, Permit 80-80. In *Archaeology in Alberta, 1980*, ed. by Jack Brink, pp. 127-138. Archaeological Survey of Alberta, Occasional Paper No. 17. Edmonton.

1981b An Archaeological Reconnaissance of the Middle and Lower Peace River, Permit 80-78. In *Archaeology in Alberta, 1980*, ed. by Jack Brink, pp. 160-167. Archaeological Survey of Alberta, Occasional Paper No. 17. Edmonton.

1981c The Prehistory of the Boreal Forest of Northern Alberta. In *Alberta Archaeology: Prospect and Retrospect*, ed. by T.A. Moore, pp. 39-58. Archaeological Society of Alberta. Lethbridge.

1982 Evaluating the Effectiveness of Site Discovery Techniques in Boreal Forest Environments. In *Directions in Archaeology: A Question of Goals*, ed. by P.D. Francis and E.C. Poplin, pp. 95-114. Chacmool, Proceedings of the Fourteenth Annual Conference. The Archaeological Association of the University of Calgary. Calgary.

1985 *A Spatial Analysis of Artifact Distribution on a Boreal Forest Archaeological Site*. Archaeological Survey of Alberta Manuscript Series No. 5. Edmonton.

1990 A Theory of Northern Athapaskan Prehistory. University of Calgary Press. Calgary.

Ives, John W. and Karie Hardie

1983 Occurrences of Tertiary Hills Welded Tuff in Northern Alberta. In *Archaeology in Alberta 1982*, ed. by David Burley, pp. 171-176. Archaeological Survey of Alberta, Occasional Paper No. 21. Edmonton.

Johnson, G.

n.d. *Nebigew* Perspective on the Slump Site. Report on file, Department of Anthropology, Univ. of Alberta. Edmonton.

Jones, Rhys and Neville White

1981 Point Blank: Stone Tool Manufacture at the Ngilipitji Quarry, Arnhem Land. In ***Archaeology with Ethnography: an Australian Perspective***, ed. by B. Meehan and R. Jones, pp. 51-87. Australian National University, Occasional Papers in Prehistory, no. 15. Canberra.

Klassen, R.W.

1989 Quaternary Geology of the Southern Canadian Interior Plains. In ***Chapter 2 of Quaternary Geology of Canada and Greenland***, ed. by R.J. Fulton, pp. 138-173. Geological Survey of Canada, Geology of Canada, no. 1. Ottawa.

Lamb, W. Kaye (ed.)

1970 ***The Journals and Letters of Sir Alexander Mackenzie***. MacMillan of Canada. Toronto.

Land Capability for Wildlife

1970a Waterfowl: Winagami, 83N. Canada Land Inventory, Department of Regional and Economic Expansion. Ottawa.

1970b Waterfowl: Lesser Slave Lake, 83/0. Canada Land Inventory, Department of Regional and Economic Expansion. Ottawa.

Le Blanc, R.J

1973 The Wigwam Brook site and the Historic Beothuk Indians. Unpublished M.A. thesis, Department of Anthropology, Memorial University of Newfoundland. St. John's.

1980 Report of Activities, Northwest Region: Provincial Parks Surveys, 1979, Permit 79-109. In ***Archaeology in Alberta, 1979***, ed. by P.F. Donahue, pp. 101-104. Archaeological Survey of Alberta, Occasional Paper No. 15. Edmonton.

1981 Archaeological Investigations in the Lesser Slave Lake Area, 1980, Permit 80-98. In ***Archaeology in Alberta, 1980***, ed. by Jack Brink, pp. 152-159. Archaeological Survey of Alberta, Occasional Paper No. 17. Edmonton.

1984 ***The Rat Indian Creek Site and the Late Prehistoric Period in the Late Prehistoric Period in the Interior Northern Yukon***. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 120. Ottawa.

1988 Archaeological Research in the Mackenzie Delta Region. Manuscript on file (No. 3059), Document Collection, Library, Canadian Museum of Civilization. Hull, Québec.

1992 Wedges, Pièces Esquillées, Bipolar Cores, and Other Things: an Alternative to Shott's View of Bipolar Industries. ***North American Archaeologist*** 13(1):1-14.

1994a The Qugyuk Site (ObRw-10 and the Archaeology of the Eastern Mackenzie Delta. In ***Bridges Across Time: The NOGAP Archaeology Project***, ed. by Jean-Luc Pilon, pp. 193-211. Canadian Archaeological Association, Occasional Paper No. 2. Hull, Québec.

1994b ***The Crane Site and the Palaeoeskimo Period in the Western Canadian Arctic***. Archaeological Survey of Canada Mercury Series, Paper No. 148. Canadian Museum of Civilization. Hull, Québec.

1997 Less Stone, More Bone: The Wider Implications of Late Prehistoric Athapaskan Technological Organization. Paper presented at the 30th Annual Meeting, Canadian Archaeological Association, Saskatoon, 7-11 May.

Le Blanc, R.J., and J. W. Ives

1986 The Bezya Site: A Wedge-Shaped Core Assemblage from Northeastern Alberta. ***Canadian Journal of Archaeology*** 10:98.

Le Blanc, R.J., and M.J. Wright

1990 Macroblade Technology in the Peace River Region of Northwestern Alaska. ***Canadian Journal of Archaeology*** 14:1-12.

Leechman, Douglas

1951 Bone Grease. ***American Antiquity*** 16(4):355-356.

Leonard, Robert D., and George T. Jones (eds.)

1989 ***Quantifying Diversity in Archaeology***. Cambridge University Press. Cambridge.

Liverman, D.G.E.

1991 Sedimentology and History of a Late Wisconsinan Glacial Lake, Grande Prairie, Alberta, Canada. ***Boreas*** 20:241-257.

Lewis, Henry T.

1982 ***A Time for Burning***. Occasional Publication No. 17, Boreal Institute for Northern Studies, The University of Alberta. Edmonton.

Lobdell, J.E.

1986 The Kuparuk Pingo site: a Northern Archaic Hunting Camp on the Arctic Coastal Plain, North Alaska. ***Arctic*** 39(1):47-51.

Lyman, R. Lee

1994 ***Vertebrate Taphonomy***. Cambridge Manuals in Archaeology. Cambridge University Press. Cambridge.

Mackay, J.R., W.H. Mathews and R.S. MacNeish

1961 Geology of the Engigstciak Archaeological Site, Yukon Territory. ***Arctic*** 14:25-52.

Mackie, Quentin

1995 ***The Taxonomy of Ground Stone Woodworking Tools***. BAR International Series 613. Oxford.

MacNeish, R.S.
1953 Archaeological Reconnaissance in the Mackenzie River Drainage. ***National Museum of Canada Bulletin 128***, pp. 23-80.
1954 The Pointed Mountain Site near Fort Liard, Northwest Territories. ***American Antiquity*** 19(3):234-253.
1955 Two Archaeological Sites on Great Bear Lake, Northwest Territories. ***National Museum of Canada Bulletin 136***, pp. 54-84.
1957 The Callison Site in the Light of Archaeological Survey of Southwest Yukon. ***National Museum of Canada Bulletin 162***, pp. 1-51.
1964 ***Investigatons in Southwest Yukon.*** Papers of the Robert S. Peabody Foundation for Archaeology 6(1-2). Andover.

Macoun, J.
1882 ***Manitoba and the Great North-west.*** The World Publishing Company. Guelph.

Magne, M.
1985 ***Lithics and Livelihood: Stone Tool Technologies of Central and Southern Interior British Columbia.*** National Museum of Man Mercury Series. Archaeological Survey of Canada, Paper No. 133. Ottawa.

Magne, M.P.R. and J.W. Ives
1991 The First Albertan Project: 1988. ***Archaeology in Alberta 1988 and 1989***, ed. by M. Magne. pp. 101-112. Archaeological Survey, Provincial Museum of Alberta, Occasional Paper No. 33. Edmonton.

Mathews, W.H.
1980 Retreat of the Last Ice Sheets in Northeastern British Columbia and Adjacent Alberta. ***Geological Survey of Canada, Bulletin 331.*** Edmonton.

Maurice, V.
1947 ***Fifty Years in the Peace River Country***. High Prairie, Alberta.

Mayer-Oakes, W.J.
1970 ***Archaeological Investigations in the Grand Rapids, Manitoba Reservoir 1961-1962.*** Occasional Papers, Department of Anthropology, University of Manitoba No. 3. University of Manitoba Press. Winnipeg.

McCammon, K. and K. Norsworthy
n.d. 1989 Refitting Study. Report on file, Department of Anthropology, Univ. of Alberta. Edmonton.

McClellan, C. and Denniston, G.
1981 Environment and Culture in the Cordillera. In ***Handbook of North American Indians, Volume 6, Subarctic***, ed. by June Helm. pp. 372-386. Smithsonian Institution. Washington, D.C.

McCullough, Edward J.

1976 Lac La Biche Archaeological Survey. In ***Archaeology in Alberta, 1975***, ed. by J.M. Quigg and W.J. Byrne, pp. 29-41. Archaeological Survey of Alberta, Occasional Paper No. 1. Edmonton.

1982 ***Prehistoric Cultural Dynamics of the Lac La Biche Region.*** Archaeological Survey of Alberta, Occasional Paper No. 18. Edmonton.

McKennan, Robert A.

1965 ***The Chandalar Kutchin.*** Arctic Institute of North America, Technical Paper No. 17. Montreal.

McFee, R.D.

1981 Caribou Fence Facilities of the Historic Yukon Kutchin. In ***Megaliths to Medicine Wheels: Boulder Structures in Archaeology***, ed. by M. Wilson, K.L. Roed and K.J. Hardy, pp. 159-170. Proceedings of the 11th Annual Chacmool Conference, Chacmool, the Archaeological Association of the University of Calgary. Calgary.

McMillan, Alan D., and Denis E. St. Claire

1982 ***Alberni Prehistory: Archaeological and Ethnographic Investigations on Western Vancouver Island.*** Theytus Books. Penticton.

Meltzer, David J.

1989 Was Stone Exchanged Among Eastern North American Paleoindians? In ***Eastern Paleoindian Lithic Resource Use***, ed. by C.J. Ellis and J. C. Lothrop, pp. 11-39. Westview Press. Boulder.

Meyer, David and Dale Russell

1987 The Selkirk Composite of Central Canada: A Reconsideration. ***Arctic Anthropology*** 24(2):1-31.

Millar, J.F.V.

1981a Introduction. The Oxbow Complex in Time and Space. ***Canadian Journal of Archaeology*** 5:83-88.

1981b Interaction between the Mackenzie and Yukon Basins during the Early Holocene. In ***Networks of the Past: Regional Interaction in Archaeology***, ed. by Peter Francis, Frank J. Kense, and P.G. Duke, pp. 260-284. Proceedings of the Twelfth Annual Conferfence, The Archaeological Association of the University of Calgary. Calgary.

Mitchell, Donald H.

1971 Archaeology of the Gulf of Georgia Area, A Natural Region and its Culture Types. Syesis, Volume 4, Supplement 1, pp. 1-228. Published by the British Columbia Provincial Museum. Victoria.

Morlan, R.E.

1973 ***The Later Prehistory of the Middle Porcupine Drainage, Northern Yukon Territory.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 5. Ottawa.

Morrison, D.A.

1984 The Late Prehistoric Period in the Mackenzie Valley. ***Arctic*** 37(3):195-209.

1987 The Middle Prehistoric Period and the Archaic Concept in the Mackenzie Valley. ***Canadian Journal of Archaeology*** 11:49-74.

Morton, A.S.

1973 ***A History of the Canadian West to 1870-71.*** Second edition. University of Toronto Press, Toronto.

Murray, Rebecca Anne

1982 ***Analysis of Artifacts from Four Duke Point Area Sites, Near Nanaimo, B.C.: An Example of Cultural Continuity in the Southern Gulf of Georgia Region.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 113. Ottawa.

Nagy, Murielle I.

n.d. Faunal Analysis of the Slump Site (GiQa-3). Report on file, Department of Anthropology, University of Alberta, Edmonton.

Nelson, D.E. and Will, G.

1976 Obsidian Sources in the Anahim Peak Area. In ***Current Research Reports,*** ed. by Roy L. Carlson, pp. 151-155. Simon Fraser University, Department of Archaeology, Publication 3. Burnaby.

Nemanishen, W. and T. Cheng

1978 ***Lesser Slave Lake Water Levels, 1914-1977.*** Environment Canada, Inland Waters Western Region, Water Survey of Canada, Calgary District Office.

Noble, W.

1971 Archaeological Surveys and Sequences in Central District of Mackenzie, N.W.T. ***Arctic Anthropology*** VIII(1):102-135.

1977 The Thaltheilei Shale Tradition: An Update. In ***Prehistory of the North American Subarctic: The Athapaskan Question,*** ed. by J.W. Helmer, S. Van Dyke and F.J. Kense, pp. 65-71. Proceedings of the 9th Annual Chacmool Conference, Chacmool, the Archaeological Association of the University of Calgary. Calgary.

1981 Prehistory of the Great Slave Lake and Great Bear Lake Region. In ***Handbook of the North American Indians, Volume 6, Subarctic,*** ed. by June Helm, pp. 97-106. Smithsonian Institution. Washington, D.C.

Osgood, Cornelius

1940 ***Ingalik Material Culture.*** Yale University Publications in Anthropology 22 (Reprinted: Human Relations Area Files Press, New Haven, Conn., 1970). New Haven.

Parker, Katherine

1980 ***Nats'ats'a' Ch'adhah Ahkhii: How I Tan Hides.*** Alaska Native Language Center, University of Alaska. Fairbanks.

Pokines, James T.

1998 Experimental Replication and Use of Cantabrian Lower Magdalenian Antler Projectile Points. ***Journal of Archaeological Science*** 25:875-886.

Pollock, John

1977 Archaeological Survey of Northern Alberta. In ***Archaeology in Alberta*** pp. 9-16, ed. by J. Michael Quigg. Archaeological Survey of Alberta, Occasional Paper No. 4. Edmonton.

1978a Archaeological Research in Central and Northern Alberta 1977. In ***Archaeology in Alberta, 1977***, ed. by W.J. Byrne, pp. 43-54. Archaeological Survey of Alberta, Occasional Paper No. 5. Edmonton.

1978b ***Early Cultures of the Clearwater River Area.*** Archaeological Survey of Alberta, Occasional Paper No. 6. Edmonton.

Pyszczyk, H.W.

1990 Prehistoric and Historical Archaeology: Fort Vermillion, Alberta. In ***Proceedings of the Fort Chipewyan and Fort Vermillion Bicentennial Conference***, ed. by P.A. McCormack and R.G. Ironside. pp. 45-52. Boreal Institute for Northern Studies. Edmonton.

1991 A Wedge-Shaped Microblade Core, Fort Vermillion, Alberta. In ***Archaeology in Alberta 1988 and 1989***, ed. by M. Magne, pp. 199-204. Archaeological Survey, Provincial Museum of Alberta, Occasional Paper No. 33. Edmonton.

Rainey, F.G.

1939 Archaeology in Central Alaska. ***Anthropological Papers of the American Museum of Natural History*** 36(4):351-405. New York.

Reeves, B.O.K.

1983 ***Culture Change inthe Northern Plains: 1000 B.C.-A.D. 1000.*** Archaeological Survey of Alberta, Occasional Paper No. 20. Edmonton.

Rogers, Edward S.

1967 ***The Material Culture of the Mistassini.*** Anthropological Series 80. National Museum of Canada, Bulletin 218. Ottawa.

Ronaghan, Brian M.

1981 Archaeological Investigations at Carson-Pegasus Provincial Park, Permit 80-169. In ***Archaeology in Alberta, 1980***, ed. by Jack Brink, pp. 115-126. Archaeological Survey of Alberta, Occasional Paper No. 17. Edmonton.

Rowe, J.S.

1972 ***Forest Regions of Canada.*** Department of the Environment, Canadian Forestry Service, Publication No. 1300.

Sanger, David

1970 The Archaeology of the Lochnore-Nesikep Locality, British Columbia. ***Syesis***, Volume 3, Supplement 1, pp. 1-146. Published by the British Columbia Provincial Museum. Victoria.

Saxberg, Nancy and Reeves, Brian

2003 The First 2000 Years of Oil Sands History: Ancient Hunters at the Northwest Outlet of Glacial Lake Agassiz. In ***Archaeology in Alberta A View from the New Millennium***, ed. by Jack W. Brink and John F. Dormaar, pp. 290-322. Archaeological Society of Alberta. Medicine Hat.

Schiffer, M.B.

1987 ***Formation Processes of the Archaeological Record.*** University of New Mexico Press. Albuquerque.

Schowalter, T.

n.d. Faunal Analysis of the Hidden Creek Site. Report in possession of the author.

Schweger, C. E.

1985 Geoarchaeology of Northern Regions: Lessons from Cryoturbation at Onion Portage, Alaska. In ***Archaeological Sediments in Context***, ed. by J.K. Stein and W.R. Farrand, pp. 127-141. University of Maine. Orono.

Scott, W.B., and E.J. Crossman

1973 ***Freshwater Fishes of Canada. Bulletin 184***, Fisheries Research Board of Canada. Ottawa.

Shennan, Stephen

1988 ***Quantifying Archaeology***. Edinburgh University Press. Academic Press.

Shafiq, R.

n.d. Replication of Stone Tool Industry [sic]. Report on file, Department of Anthropology, Univ. of Alberta. Edmonton

Shinkwin, A.D.

1978 ***Dakah De'nin's Village and the Dixthada Site: a Contribution to Northern Athapaskan Prehistory***. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 91. Ottawa.

Shott, M.J.

1989 Bipolar Industries: Ethnographic Evidence and Archaeological Implications. ***North American Archaeologist*** 10(1):1-24.

Schowalter, Tim

n.d. Faunal Analysis ofthe Hidden Creek Site. Report on file, Department of Anthropology, University of Alberta. Edmonton.

Sims, Cort

1976 A Preliminary Report Concerning An Archaeological survey of Certain Boreal Forest Highway Projects in Northeastern Alberta—1975. In ***Archaeology in Alberta, 1975***, ed by J. Michael Quigg and W.J. Byrne, pp. 20-23. Archaeological Survey of Alberta, Occasional Paper No. 1. Edmonton.

1977 A Notched Burin from Northern Alberta. ***The Alberta Archaeological Review*** 1, no pagination.

1981 Archaeological Investigations in the North Wabasca Lake Area: the Alook Site. ***Alberta Archaeological Review*** 3.

Soper, J.D.

1941 History, Range and home life of Northern Bison. ***Ecological Monographs*** Vol. 11:347-412. Durham.

Spence, H.S.

1940 Talc, Steatite, and Soapstone; Pyrophyllite [sic]. ***Canada Department of Mines and Resources, Mines and Geology Branch, No. 803.*** Ottawa.

St. Onge, D.A.

1972 Sequence of Glacial Lakes in North-Central Alberta. ***Geological Survey of Canada, Bulletin 213.*** Edmonton.

Steinbring, Jack

1966 The Manufacture and Use of Bone Defleshing Tool. ***American Antiquity*** 31(4):575-581.

Stevenson, Marc

1985 The Formation of Artifact Assemblages at Workshop/Habitation Sites: Models from Peace Point in Northern Alberta. ***American Antiquity*** 50(1):63-81.

1986 ***Window on the Past: Archaeological Assessment of the Peace Point Site Wood Buffalo National Park, Alberta.*** National Historic Parks and Sites Branch, Parks Canada, Environment Canada. Ottawa.

Stuiver, M. and P.J. Reimer

1993 Extended 14C Database and Revised CALIB Radiocarbon Calibration Program. ***Radiocarbon*** 35:215-230.

Stuiver, M., P.J. Reimer, E. Bard, J.W. Beck, G.S. Burr, K. A. Hughen, B. Kromer, F.G. McCormac, J. v. d. Plicht and M. Spurk

1998 INTCAL98 Radiocarbon age calibration 24,000 - 0 cal BP. ***Radiocarbon*** 40: 1041-1083.

Sutherland, P.

1991 Archaeological Reconnaissance on the Tuktoyaktuk Peninsula. Manuscript on file (No. 3473, Vol. 4), Document Collection, Library, Canadian Museum of Civilization. Hull, Québec.

Syncrude Canada

1974 ***The Beaver Creek Site:*** a Prehistoric Stone Quarry on Syncrude Lease #22. Environmental Research Monograph 1974-2.

Taçon, Paul

1991 The Power of Stone: Symbolic Aspects of Stone Use and Tool Development in Western Arnhem Land, Australia. ***Antiquity*** 65(247):192-207.

Thomson, Ross

1973 An Introduction to the Prehistory of the Peace River Country. M.A. thesis, Department of Anthropology, University of Alberta. Edmonton.

Townsend, L.

n.d. Refit Analysis 1990: GiQa-3. Report on file, Department of Anthropology, Univ. of Alberta, Edmonton.

University of Alberta

1969 ***Atlas of Alberta.*** University of Alberta Press, Edmonton.

Vickers, J. Roderick

1986 ***Alberta Plains Prehistory: A Review***. Archaeological Survey of Alberta, Occasional Paper No. 27. Edmonton.

Villa, Paola

1982 Conjoinable Pieces and Site Formation Processes. ***American Antiquity*** 47:276-290.

Villa, Paola and Jean Courtin

1983 The Interpretation of Stratified Sites: A View from Underground. ***Journal of Archaeological Science*** 10:267-281.

Wallis, W.D., and R.S. Wallis

1955 ***The Micmac Indians of Eastern Canada.*** University of Minnesota Press, Minneapolis.

Warbelow, C., David Roseneau and Peter Stern

1975 The Kutchin Caribou Fences of Northeastern Alaska and the Northern Yukon. In ***Studies of Large Mammals Along the Proposed Mackenzie Valley Gas Pipeline Route from Alaska to B.C.***, ed. by R.D. Jakimchuk, Chapter 4. Canadian Arctic Gas Study Limited, Biological Report Series, Vol. 32.

Wilmeth, Roscoe

1978 ***Anahim Lake Archaeology and the Early Historic Chilcotin Indians.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 82. Ottawa.

Wilson, I. R.

1987 The Pink Mountain Paleo-Indian Site. In ***Archaeology in Alberta, 1986***, ed. by M. Magne, pp. 217-219. Archaeological Survey of Alberta, Occasional Paper No. 31. Edmonton.

1989 The Pink Mountain Site (HhRr-1): an Early Prehistoric Campsite in Northeastern B.C. ***Canadian Journal of Archaeology*** 13:69-96.

1996 Paleoindian Sites in the Vicinity of Pink Mountain. In ***Early Human Occupation in British Columbia***, ed. by R. L. Carlson and Luke Dalla Bona, pp. 29-34. University of British Columbia Press, Vancouver.

Wood, W.J.

1978 An Archaeological Appraisal of Bistcho Lake, Far Northwestern Alberta. In ***Archaeology in Alberta, 1977***, ed. by W.J. Byrne, pp. 11-22. Archaeological Survey of Alberta, Occasional Paper No. 5. Edmonton.

Wood, R.W. and D.L. Johnson

1978 A Survey of Disturbance Process in Archaeological Site Formation. In ***Advances in Archaeological Method and Theory*** Vol. 1, ed. by M.B. Schiffer, pp. 315-81. Academic Press, New York.

Workman, William

1978 ***Prehistory of the Aishihik-Kluane Area, Southwest Yukon Territory***. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 74. Ottawa.

Wormington, H.M. and Richard Forbis

1965 ***An Introduction to the Archaeology of Alberta.*** Denver Museum of Natural History, Proceedings 11. Denver.

Wright, J.V.

1968 Prehistory of Hudson Bay — the Boreal Forest. In ***Science, History and Hudson Bay***, Vol. 1, ed. by C.S. Beals and D.A. Shenstone, pp. 55-68. Department of Energy, Mines and Resources. Ottawa.

1970 The Shield Archaic in Manitoba - A Preliminary Statement. In Ten ***Thousand Years, Archaeology in Manitoba,*** ed. by W.M. Hlady, pp. 29-45. Manitoba Archaeology Society, Winnipeg.

1972 ***The Shield Archaic.*** National Museum of Man, Publications in Archaeology, No. 3. Ottawa.

1975 ***The Prehistory of Lake Athabasca: an Initial Statement.*** National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 29. Ottawa.

1981 Prehistory of the Canadian Shield. In Handbook of the ***North American Indians, Volume 6, Subarctic,*** ed. by June Helm, pp. 86-96. Smithsonian Institution. Washington, D.C.

1995 ***A History of the Native People of Canada, Vol. 1 (10,000-1,000 B.C.).*** Mercury Series, Archaeological Survey of Canada Paper No. 152, Canadian Museum of Civilization. Hull, Québec.

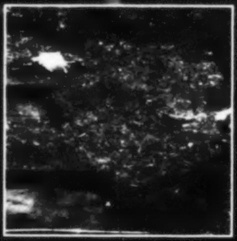
1999a ***A History of the Native People of Canada, Volume II (1,000 B.C. -A.D. 500).*** Mercury Series Archaeological Survey of Canada, Paper No. 152. Canadian Museum of Civilization. Hull, Québec.

1999b Comments: Archaeological Cultural Constructs and Systematics: A Proposed Classification System for Canada. In ***Taming the Taxonomy: Toward a New Understanding of Great Lakes Archaeology,*** ed. by Ronald F. Williamson and Christopher M. Watts, pp. 289-300. Eastend Books. Toronto.

Zutter, C.

n.d. Archaeobotanical Analysis: Slump Site, Hilliard's Bay Provincial Park. Report on file, Department of Anthropology, Univ. of Alberta, Edmonton.

Archaeological Research in the Lesser Slave Lake Region
A Contribution to the Pre-Contact History of the Boreal Forest of Alberta



This important new work presents the results of archaeological investigations carried out in the Lesser Slave Lake region of Alberta, Canada during the 1980s and 1990s. The book offers evidence of a long sequence of occupation in the area, beginning in late Holocene times. It also presents evidence of the extensive trade and communication networks which existed in the distant past, with raw materials arriving in the region from hundreds of kilometres away. The author also details cultural influences from areas to the north, as well as indications of contact with Plains groups to the south, and provides information relating to the Cree who lived in the area at the dawn of contact with Euro-Canadians.

About the Author

Dr. Raymond J. Le Blanc is an associate professor of anthropology at the University of Alberta. He received his post-graduate training at Memorial University of Newfoundland and the University of Toronto. He has conducted fieldwork in Newfoundland, Alberta, the Northwest Territories and most recently, the northern Yukon.

Mercury Series
Archaeology Paper 166

ISBN 0-660-19331-0
9 780660 193311

CANADIAN MUSEUM OF CIVILIZATION MUSÉE CANADIEN DES CIVILISATIONS

Canadä